

SUBDIVISION REGULATIONS

FOR

MADISON, INDIANA

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**CITY OF MADISON
INDIANA
SUBDIVISION REGULATIONS**

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ORDINANCE NO. _____

PREAMBLE

AN ORDINANCE ESTABLISHING SUBDIVISION REGULATIONS FOR THE CITY OF MADISON, INDIANA, PRESCRIBING MINIMUM REQUIREMENTS WITH RESPECT TO SUBDIVISION, PROVIDING FOR THE PROCEDURE FOR SUBDIVIDING; DESIGN STANDARDS OF STREETS, BLOCKS, LOTS, EASEMENTS, PUBLIC UTILITIES, AND IMPROVEMENTS; THE FIXING OF FEES FOR PROCESSING; AND PROVIDING FOR THE ENFORCEMENT OF THE PROVISIONS OF THIS ORDINANCE.

WHEREAS, land subdivision is the first step in the process of community expansion, and

WHEREAS, once land has been divided into streets, blocks, lots, and open spaces, a pattern has been established which usually determines how well community needs for residence, business, and industry will be met, and

WHEREAS, land subdivision determines to a great extent how well the community will be able to deal with traffic circulation problems, drainage problems, and the demand for home sites, and how efficiently it will be able to provide the many services demanded of it, and

WHEREAS, subdivided land areas soon become a public responsibility in that roads, streets, drainage and public utilities must be maintained and various public services customary to urban areas must be provided, and

WHEREAS, the guidance of land development in harmony with community objectives is a matter of serious public concern and community welfare, and

WHEREAS, it is the interest of the public, the developer, and future land owners that subdivisions be conceived, designed, and developed in accordance with sound minimum standards, and

WHEREAS, Indiana law empowers the City to enact a subdivision regulations ordinance and to provide for its administration, enforcement, and amendment, and

WHEREAS, the City Council deems it necessary for the purpose of providing for the harmonious development and coordinated layout for the subdivided area; for the proper arrangement of streets; for adequate and convenient open spaces for traffic, utilities, recreation, light, air and access of fire-fighting equipment; for avoidance of population congestion through requirements for minimum lot widths and lot area; for adequate sanitary facilities; and for reducing flood damage potentials to the greatest extent possible.

NOW THEREFORE BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MADISON, INDIANA:

ARTICLE I
GENERAL PROVISIONS

SECTION A - TITLE

These regulations shall be known and cited as the Subdivision Regulations of the City of Madison, Indiana.

SECTION B - PURPOSE

1. The purpose of these regulations are to protect and promote the public health, safety, and general welfare, and to provide for:
 - a. Guidance for future growth and development in accordance with the comprehensive planning process.
 - b. Adequate air, light, and privacy, and to prevent overcrowding of the land and undue congestion.
 - c. Protection of the character and the social and economic stability of all parts of the area, and to encourage the orderly and beneficial development of all parts.
 - d. Protection and conservation of the value of land, buildings, and other improvements upon the land, and to minimize the conflicts among the uses of land and buildings.
 - e. Guidance of public and private policy and action in order to assure adequate and efficient transportation, water, sewerage, schools, parks, drainage, and other public requirements and facilities.
 - f. Avoidance of scattered and uncontrolled subdivision of land that would result in the unnecessary imposition of an excessive expenditure of public funds for the supply of services that are a part of community infrastructure.
 - g. Establishment of reasonable standards of design and minimum requirements for the creation, installation, and improvement of physical facilities which are, or will be, maintained for the benefit of general public.
 - h. Establishment of reasonable standards and procedures for subdivisions and resubdivisions, in order to further the orderly layout and use of land, and to insure proper legal descriptions and monumenting of subdivided land.

- i. Prevention of the pollution of air and water; provision of drainage facilities and the safeguarding of the water table; and the encouragement of wise use and management of natural resources in order to preserve the integrity, stability, natural beauty and topography, and the value of land.
- j. Administration of these regulations by defining the powers and duties of approval authorities; and the manner and form of making, filing, and processing of any plat.

SECTION C - AUTHORITY AND JURISDICTION

1. This ordinance which was enacted pursuant to Indiana home rule and planning enabling legislation (Indiana Code, titles 36-1-3-4 and the 36-7-4-700 series, as amended) authorizes the Madison Plan Commission to review and approve or disapprove plats for subdivision within the jurisdiction of the City which show lots, blocks, or sites with or without new streets or highways. With regard to this ordinance, jurisdiction shall include the corporate limits and two mile planning limits of the City of Madison, Indiana, as may be amended by subsequent annexation. This authority extends to the development or redevelopment of undeveloped portions of previously recorded plats.
2. No improvement location permit, building permit or certificate of occupancy shall be issued for any parcel or plat of land which was created by subdivision after the effective date of, and not in conformity with, the provisions of these subdivision regulations, and no excavation of land or construction of any public or private improvements shall take place or be commenced except in conformance of the regulations contained herein and including the Construction Standards adopted by the City of Madison.

SECTION D - INTERPRETATION, CONFLICT, AND SEPARABILITY

1. In their interpretation and application, the provisions of these regulations shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare.

2. Conflict with Public and Private Provisions

a. Public Provisions

The regulations are not intended to interfere with, abrogate, or annul any other ordinance, rule or regulation, statute, or other provision of law. Where any provision of these regulations imposes restrictions different from those imposed by any other provision of these regulations or any other ordinance, rule or regulation, or other provision of law, whichever provisions are more restrictive or impose higher standards shall control.

b. Private Provisions.

The regulations are not intended to abrogate any easement, covenant or any other private agreement or restriction, provided that where the provisions of these regulations are more restrictive or impose higher standards or regulations than such easement, covenant, or other private agreement or restriction, the requirements of these regulations shall govern. Where the provisions of the easement, covenant, or private agreement or restriction impose duties and obligations more restrictive, or higher standards than the requirements of these regulations, or the determinations of the Commission in approving a subdivision or in enforcing these regulations, and such private provisions are not inconsistent with these regulations or determinations thereunder, then such private provisions shall be operative and supplemental to these regulations and determinations made thereunder.

3. Separability

If any part or provision of these regulations or applicant thereof to any person or circumstances is adjudged invalid by any court of competent jurisdiction, such judgment shall be confined in its operation to the part, provision, or application directly involved in all controversy in which such judgment shall have been rendered and shall not affect or impair the validity of the remainder of these regulations or the application therefor to other persons or circumstances. The City hereby declares that it would have enacted the remainder of these regulations even without any such part, provision or application.

SECTION E - SAVING PROVISION

These regulations shall not be construed as abating any action now pending under, or by virtue of, prior existing subdivision regulations, or as discontinuing, abating, modifying, or altering any penalty accruing or about to accrue, or as affecting the liability of any person, firm, or corporation, or as waiving any right of the City under any section or provision existing at the time of adoption of these regulations, or as vacating or annulling any rights obtained by any person, firm, or corporation, by lawful action of the City except as shall be expressly provided for in these regulations.

SECTION F - REPEALER

Upon adoption of this Ordinance No. ____ according to law, the Subdivision Regulations ordinance of the City of Madison adopted June 30, 1970, as amended are hereby repealed, except for such sections expressly retained herein.

SECTION G - AMENDMENTS

For the purpose of protecting and promoting public health, safety, and general welfare, the Plan Commission may from time to time amend the provisions imposed by these regulations. Public hearings on all proposed amendments shall be held by the Plan Commission in the manner prescribed by law.

SECTION H - RESUBDIVISION OF LAND

1. Procedure for Resubdivision

For any change in a map of an approved or recorded subdivision plat, if such change affects any street layout shown on such map, or area reserved thereon for public use, or any lot line, or if it affects any map or plan legally reached prior to the adoption of any regulations controlling subdivisions, such parcel shall be approved by the Commission by the same procedure, rules, and regulations as for a subdivision.

2. Procedure for Subdivisions Where Future Resubdivision is Indicated

Whenever a parcel of land is subdivided and the subdivision plat shows one or more lots containing more than one acre of land and there are indications that such lots will eventually be resubdivided into smaller building sites, the Commission may require that such parcel of land allow for the future opening of streets and the ultimate extension of adjacent streets. Easements providing for the future opening and extension of such streets may be made a requirement of the plat.

SECTION I - VACATION

1. Any recorded plat or part thereof may be vacated only in accordance with I.C. 36-7-3 as amended.
2. Power is given to the City to vacate by proper ordinance any such existing plat and addition to the City or such part or parts thereof as such City may deem advantageous and best for its interests, and the power granted shall be exercised by the City upon the petition of the owner or all of the owners of lots or lands in such plat or addition.
3. Such ordinance vacating such plat or addition shall specify whether, and, if any, what public highways, streets, alleys, and public grounds thereof are to be retained by the City; otherwise such ways, streets, and public grounds shall upon such vacation revert to the owner or owners of lots or lands abutting the same in proportion to the respective ownerships of such lots or grounds. In case of total or partial vacation of such plat or addition, the ordinance providing therefore shall be, at the cost of the owner or owners, certified to the office of the County Recorder and be there recorded by the owner or owners. Whereupon said officer shall note

such total or partial vacation of such plat or addition by writing in plain and legible letters upon such plat or portion thereof so vacated the word "vacated," and also make on the same, reference to the volume and page in which said ordinance of vacation is recorded; and the owner or owners of the lots and lands in a plat so vacated shall cause the same and the proportionate part of the abutting highway, streets, alleys, and public grounds so vacated to be replatted and numbered by the City or County Surveyor. When such replat so executed is acknowledged by such owner or owners and is recorded in the office of the County Recorder of such county such property so replatted may be conveyed and assessed by the numbers given in such replat.

SECTION J - VARIANCES

1. Where the Plan Commission finds that extraordinary hardships or practical difficulties may result from strict compliance with these regulations and/or the purposes of these regulations may be served to a greater extent by an alternative proposal, it may approve variances to these subdivision regulations so that substantial justice may be done and the public interest secured, provided that such variance shall not have the effect of nullifying the intent and purpose of these regulations; and further provided the Plan Commission shall not approve variances unless it shall make findings based upon the evidence presented to it in each specific case that:
 - a. The granting of the variance will not be detrimental to the public safety, health, or welfare, or injurious to other property.
 - b. The conditions upon which the request for a variance is based are unique to the property for which the variance is sought and are not applicable generally to other property.
 - c. Because of the particular physical surroundings, shape or topographical conditions of the specific property involved, a particular hardship to the owner would result, as distinguished from a mere inconvenience, if the strict letter of these regulations are carried out.
 - d. The variance will not in any manner vary the provisions of the Zoning Ordinance or Comprehensive Plan as interpreted by the Commission or their agents.
 - e. Where the variance impacts on design and construction of public facilities, all appropriate public agencies have been given ample time to comment in writing to the Commission.
2. In approving variances, the Plan Commission may require such conditions as will, in its judgment, secure substantially the objectives of the standards or requirements of these regulations.

3. A petition for any such variance shall be submitted in writing by the subdivider at the time when the sketch plat is filed for the consideration of the Commission. The petition shall state fully the grounds for the application and all of the facts relied upon by the petitioner.
4. Financial disadvantage to the property owner is not proof of hardship within the purpose of this Ordinance.
5. A comprehensive group housing, commercial, or industrial development, including the large-scale construction of housing commercial or industrial units together with necessary drives and ways of access, may be approved by the Plan Commission although the design of the project does not include standard street, lot, and subdivision arrangements, provided that departure from the standards of these regulations can be made without destroying their intent and is in accordance with the provisions of the zoning ordinance relating to planned development.

SECTION K - ENFORCEMENT, VIOLATION, AND PENALTIES

1. General

- a. It shall be the duty of the Plan Commission to enforce these regulations and to bring any violations or lack of compliance to the attention of the City Attorney.
- b. No owner, or agent of the owner, of any parcel of land located in a proposed subdivision shall transfer or sell any such parcel before a plat of such subdivision has been approved by the Commission, in accordance with the provisions of these regulations, and filed with the County Recorder.
- c. The division of any lot or any parcel of land into a subdivision, as defined in this ordinance, by the use of metes and bounds description for the purpose of sale, or transfer, or lease resulting in the creation of one or more new building sites shall not be permitted. All such described divisions shall be subject to all of the appropriate requirements of this ordinance.
- d. No Improvement Location Permit or Building Permit required under the Uniform Building Code, the Zoning Ordinance or this ordinance shall be issued on any property subject to this ordinance until the provisions of this ordinance have been complied with.

2. Violations and Penalties

Any person who violates a provision of this ordinance or any regulations herein contained, shall be guilty of a misdemeanor and, upon conviction, shall be fined not less than ten dollars (\$10.00) and not more than three hundred dollars (\$300.00) for each day in violation.

3. Restraining Provisions

- a. Any land within the participating jurisdictions subdivided in violation of the terms of this ordinance after the effective date hereof, is hereby declared to be a common nuisance, which may be restrained, enjoined or abated in any appropriate action or proceeding.
- b. The Commission may institute an injunction suit requesting an individual or governmental unit be directed to remove a structure erected in violation of this ordinance, or to make the same comply with its terms. If the Commission is successful in its suit, the respondent shall bear the costs of the action.
- c. The Commission may institute a suit for mandatory injunction requesting an individual or governmental unit be directed, where such individual or governmental unit has violated any provisions of this ordinance, to comply with the provisions of this ordinance. If the Commission is successful in its suit, the respondent shall pay the Commission's reasonable attorney fees and all costs related to the enforcement of this Ordinance.

SECTION L - APPEALS

Any decision or requirement of the Plan Commission made under the authority of this ordinance is subject to the right of appeal and review by certiorari provided written appeal is taken no more than thirty (30) days from such Commission action.

ARTICLE II

DEFINITIONS AND TERMS

SECTION A - GENERAL

1. For the purpose of these regulations, certain numbers, abbreviations, terms and words used herein shall be used, interpreted, and defined as set forth in this section.
2. Unless the context clearly indicates to the contrary, words used in the present tense include the future tense; words used in the plural number include the singular; the word "herein" means "in these regulations"; the word "regulations" means "these regulations".
3. A "person" includes a corporation, a partnership, and an incorporated association of persons such as a club; "shall" is always mandatory; "used" or "occupied" as applied to any land or building shall be construed to include the words "intended, arranged, or designed to be used or occupied".

SECTION B - DEFINITIONS

ALLEY - A public or private vehicular right-of-way primarily designed to serve as secondary access to the side or rear of those properties whose principal frontage is on some other street.

APPLICANT - The owner of land proposed to be subdivided or his representative. Consent shall be required from the legal owner of the premises.

ARTERIAL - Either a Primary Arterial or a Secondary Arterial as defined in this section.

BLOCK - A tract of land bounded by streets, or by a combination of streets and public parks, cemeteries, railroad rights-of-way, shorelines of waterways, or boundary lines of municipalities.

BOND - Any form of security including a cash deposit, surety bond, collateral, property, or instrument of credit in an amount and form satisfactory to the Plan Commission. All bonds shall be approved by the Commission wherever a bond is required by these regulations.

BUILDING - Any roofed structure built for the support, shelter, or enclosure of persons, animals, chattels, or movable property of any kind.

BUILDING CODE - That City ordinance or group of ordinances establishing and controlling the standards for constructing buildings, utilities, mechanical equipment and all forms of structures and permanent installations and related matters, within the City. Also referred to herein as the City Building Code.

BUILDING SITE - An area proposed or provided and improved by grading, filling, excavation, or other means for erecting pads or foundations for buildings.

CAPITAL IMPROVEMENTS PROGRAM - A proposed schedule for all future projects in order of construction priority together with cost estimates and the anticipated means of financing each project. All major projects requiring the expenditure of public funds, over and above the annual local governments operating expenses, for the purchase, construction, or replacement of the physical assets for the community are included.

CENTRAL SEWERAGE SYSTEM - A community sewer system including collection and treatment facilities established by the developer to serve a new subdivision in an outlying or generally rural area.

CENTRAL WATER SYSTEM - A private water company formed by a developer to serve a new community development in an outlying or generally rural area. It includes water treatment and distribution facilities.

CHANNEL - A natural or artificial watercourse of perceptible extent, with definite bed and banks to confine and conduct continuously or periodically flowing water.

CITY ATTORNEY - The licensed attorney designated by the legally authorized body to furnish legal assistance for the administration of these regulations in lieu of the Commission having its own attorney.

CITY ENGINEER - The licensed engineer designated by the City to furnish engineering assistance in the administration of these regulations.

CLASSIFICATION OF STREETS - For the purpose of providing for the development of the streets, highways, roads, and right-of-way in the governmental unit, and for their future improvement, reconstruction, realignment, and necessary widening, including provision for curbs and sidewalks, each existing street, highway, road, and right-of-way and those located on approved and filed plats, have been designated in the Transportation Plan within the Comprehensive Plan and classified therein. The classification of each street, highway, road, and right-of-way is based upon its location in the respective zoning districts and its present and estimated future traffic volume and its relative importance and function as specified in the Comprehensive Plan of Madison. The required improvements shall be measured as set forth for each street classification in the Transportation Plan.

Functional Classification is defined as the process by which streets and roads are grouped into classes, or systems, according to the character of service they are intended to provide.

Functional classification can be applied in planning street and road system development, determining the jurisdictional responsibility for particular systems, and in fiscal planning. Three main classes are generally accepted under the functional classification scheme: arterials, collectors, and locals.

COLLECTOR STREET - A street intended to move traffic from local streets to secondary arterials.

(A collector street serves a neighborhood or large subdivision and should be designed so that no residential properties face onto it and no driveway access to it is permitted unless the property is to be in multifamily use for four (4) or more dwelling units.)

COMMISSION - The Plan Commission, appointed in accordance with I.C. 18-7-5.

COMPREHENSIVE PLAN - Inclusive physical, social, and economic plans and policies in graphic and verbal statement forms for the development of the City prepared and adopted by the Commission pursuant to the State Acts, and including any part of such plan and/or policies separately adopted and any amendment to such plan and/or policies, or parts thereof.

CONDOMINIUM - An estate consisting of an undivided interest in common in real property, in an interest or interests in real property, or in any combination thereof; together with a separate interest in real property, in an interest or interests in real property, or in any combination thereof.

CONSTRUCTION PLAN - The maps, drawings, and textual descriptions accompanying a subdivision plat and showing the specific location and design of improvements to be installed in the subdivision in accordance with the requirements of the Commission as a condition of the approval of the plat.

CONSTRUCTION STANDARDS - The City of Madison Construction Standards for Development and Public Improvements as adopted and amended.

COUNCIL - The City Council.

COVENANT - A written promise or pledge.

CUL-DE-SAC - A local street with only one (1) outlet and having an appropriate terminal for the safe and convenient reversal of traffic movement including public safety vehicles.

CULVERT - A drain that channels water under a bridge, street, or driveway.

DEAD-END STREET - A street or a portion of a street with only one (1) vehicular traffic outlet, and no turnaround at the terminal end.

DEDICATION - The setting apart of land or interests in land for use by the public by ordinance, resolution, or entry in the official minutes as by the recording of a plat.

DEVELOPER - Authorized agent(s) of a subdivider or the subdivider himself. The developer may be the owner of land proposed to be subdivided or his representative, the subdivider.

DRIVES, PRIVATE - Vehicular streets and driveways, paved or unpaved, which are wholly within private property except where they intersect with other streets within public rights-of-way.

EASEMENT - An authorization grant by a property owner for the use by another of any designated

part of his property for a clearly specified purpose(s).

ESCROW - A deposit of cash with the Commission in lieu of an amount required and still in force on a performance or maintenance bond. Such escrow funds shall be held by the City Clerk.

FINAL PLAT APPROVAL - The stage of application for formal Plan Commission approval of a final plat of a subdivision the construction of which has been completed or substantially completed which, if approved and signed by the designated officials may be submitted to the County Recorder for filing.

FLEXIBLE ZONING - Zoning which permits uses of land and density of buildings and structures different from those which are allowed within the zoning district in which the land is situated. Flexible zoning applications shall include, but not be limited to, all special permits and special uses, group housing projects, and planned unit development.

FLOOD PLAIN - The relatively flat area or low land adjoining the channel of a river or stream which has been or may be covered by flood water. The flood plain includes the channel, floodway, and floodway fringe.

FLOOD PROTECTION GRADE - The elevation of the lowest point around the perimeter of a building at which flood waters may enter the interior of the building.

FLOODWAY - (See Regulatory Floodway)

FOUNDATION - The supporting member of a wall or structure.

FRONTAGE - The length along the street right-of-way line of a single lot, tract, or development area between the side lot lines of the property. It is that side of a lot abutting a street and ordinarily regarded as the front of the lot.

GRADE - The slope of road, street, or other public way, specified in terms of percentage (%).

HEALTH DEPARTMENT AND HEALTH OFFICER - The agency and person designated by the City to administer the health regulations within the City's jurisdiction.

IMPROVEMENT - Any alteration to the land or other physical constructions associated with subdivision and building site development.

IMPROVEMENT, LOT - Any building, structure, place, work of art, or other object, or improvement of the land on which they are situated constituting a physical betterment of real property, or any part of such betterment. Certain lot improvements shall be properly bonded as provided in these regulations.

IMPROVEMENT, PUBLIC - Any drainage ditch, roadway, sidewalk, tree, lawn, off-street parking area, lot improvement, or other facility for which the local or state government may ultimately assume the responsibility for maintenance and operation, or which may affect an improvement for which local or state government responsibility is established. All such improvements shall be properly bonded.

IMPROVEMENT, TEMPORARY - Improvements built and maintained by a subdivider during construction of the subdivision and prior to release of the performance bond.

INDIANA CODE - The *Burns Indiana Statutes Code Edition*, which codifies all Indiana statutes for reference purposes. The latest edition with any amending supplements must be referred to for the laws currently in force and applicable. (Usually abbreviated as I.C. herein).

INDIVIDUAL SEWAGE DISPOSAL SYSTEM - A septic tank, seepage tile sewage disposal system, or any other approved sewage treatment device.

INFRASTRUCTURE - The fixed public works and facilities necessary in a community, such as sewers, water systems, storm and drainage systems, and streets.

INTERESTED PARTIES - Those parties who are the owners of properties adjoining or adjacent to the proposed subdivision as shown on the sketch plan.

JURISDICTION - Jurisdiction of local government means all land within its boundaries and any land outside its boundaries over which it is authorized to exercise powers under these regulations.

LAND - The earth, water, and air, above, below or on the surface, and includes any improvements or structures customarily regarded as land.

LAND USE - The development existing on land.

LOCAL STREET - A street intended to provide access to other streets from individual properties and to provide right-of-way beneath it for sewer, water, and storm drainage pipes.

LOT - A tract, plot, or portion of a subdivision or other parcel of land intended as a unit for the purpose, whether immediate or future, of transfer of ownership or for building development. The lot shall be of suitable size as required in this ordinance and the existing zoning ordinance.

MODEL HOME - A dwelling unit used initially for display purposes which typifies the type of units that will be constructed in the subdivision. Such dwelling units may be erected, at the discretion of the Planning Commission, by permitting a portion of a major subdivision involving no more than three (3) lots to be created according to the procedures for minor subdivision, as set in these regulations.

MONUMENT - Any permanent marker either of concrete, galvanized iron pipe, or iron or steel rods, used to identify any tract, parcel, lot, or street lines.

NONRESIDENTIAL SUBDIVISION - A subdivision whose intended use is other than residential,

such as commercial or industrial.

OFF-SITE - Any premises not located within the area of the property to be subdivided, whether or not in the same ownership of the applicant for subdivision approval.

ORDINANCE - Any legislative action, however denominated, of a local government which has the force of law, including any amendment or repeal of any ordinance.

OWNER - Any person, firm, association, syndicate, partnership, corporation, or any other legal entity having legal title to or sufficient proprietary interest in the land sought to be subdivided under these regulations.

PARCEL - A part or portion of land having a legal description formally set forth in a conveyance together with the boundaries thereof, in order to make possible its easy identification.

PLAN COMMISSION - The City's plan body as established in accordance with Indiana law, often referred to herein simply as the Commission.

PLANNED UNIT DEVELOPMENT - Planned unit development is a means of land regulations which permits large scale, unified land development in a configuration and possibly a mix of uses not otherwise permitted "as the right" under the City ordinance but requiring under that ordinance or a special ordinance a special review and approval process.

PLAT - The drawing, map, or plan of a subdivision or other tract of land or a replat of such including certification, descriptions, and approval.

PLAT, FINAL - The final and formal presentation of the map, plan, or record of a subdivision and any accompanying material, as described in these regulations.

PLAT, PRELIMINARY - The preliminary drawing or drawings, described in these regulations, indicating the proposed manner or layout of the subdivision to be submitted to the Commission for approval.

PLAT, SKETCH - A sketch preparatory to the preparation of the preliminary plat (or final plat in the case of minor subdivisions) to enable the subdivider to save time and expense in reaching general agreement with the Commission as to the form of the plat and the objectives of these regulations.

PRELIMINARY PLAT APPROVAL - An approval (or approval with conditions imposed) granted to a subdivision by the Commission after having determined in a public hearing that the subdivision complies with the standards prescribed in this Ordinance (per I.C. § 36-7-700 series: Subdivision Control).

PRIMARY ARTERIAL - A street intended to move through-traffic to and from such major attractors as central business districts, regional shopping centers, colleges and/or universities, military

installations, major industrial areas, and similar traffic generators within the City a major thoroughfare.

REGISTERED LAND SURVEYOR - A land surveyor properly licensed and registered or through reciprocity permitted to practice in the State of Indiana.

REGISTERED PROFESSIONAL ENGINEER - An engineer properly licensed and registered in the State of Indiana or permitted to practice in Indiana through reciprocity.

REGULATORY FLOOD - That flood having a peak discharge which can be equaled or exceeded on the average of once in a one hundred (100) year period, as calculated by a method and procedure which is acceptable to and approved by the Indiana Natural Resources Commission; this flood is equivalent to a flood having a probability of occurrence of one percent (1%) in any given year.

REGULATORY FLOOD ELEVATION - The maximum elevation, as established by the Indiana Department of Natural Resources, reached by the Regulatory Flood at the locations in question relevant to approval of a given subdivision under consideration.

REGULATORY FLOODWAY - The channel of a river or stream and those portions of the Flood Plains adjoining the channel which are reasonably required to efficiently carry and discharge the peak flow of the Regulatory Flood of any river or stream shown on the Floodway-Flood Boundary Maps of the Federal Emergency Management Agency.

RESERVE STRIP - A strip of land between a partial street and adjacent property, which is reserved or held in public ownership for future street extension or widening.

RESUBDIVISION (REPLAT) - A change in a map of an approved or recorded subdivision plat if such change affects any street layout on such map or area reserved thereon for public use, or any lot line; or if it affects any map or plan legally recorded prior to the adoption of any regulations controlling subdivisions.

RIGHT-OF-WAY - A strip of land occupied or intended to be occupied by transportation facilities, public utilities, or other special public uses. Rights-of-way intended for any use involving maintenance by a public agency shall be dedicated to the public use by the maker of the plat on which such right-of-way is established.

SALE OR LEASE - Any immediate or future transfer of ownership, or any possessory interest in land, including contract of sale, lease, devise, interstate succession, or transfer, of an interest in a subdivision or part thereof, whether by deed, metes and bounds, contract, or other written instrument.

SECONDARY ARTERIAL - A street intended to collect and distribute traffic in a manner similar to primary arterials, except that these streets service minor traffic generating areas such as community-commercial areas, primary and secondary educational plants, hospitals, major recreational

areas, churches, and offices, and/or designed to carry traffic from collector streets to the system of primary arterials.

SETBACK - A line parallel to the relevant lot line (front, back, side) between which no buildings or structures may be erected as prescribed in the City Zoning Ordinance.

STATE - The State of Indiana.

STREET RIGHT-OF-WAY WIDTH - The distance between property lines measured at right angles to the center line of the street.

STRUCTURE - Anything constructed or erected that requires location on or in the ground or is attached to something having a location on or in the ground.

SUBDIVIDER - A subdivider shall be deemed to be the individual, firm, corporation, partnership, association, syndicate, trust, or other legal entity that executes the application and initiates proceedings for the subdivision of land in accordance with the provisions of this ordinance. The subdivider need not be the owner of the property; however, he shall be an agent of the owner or have sufficient proprietary rights in the property to represent the owner.

SUBDIVISION - Any land, vacant, or improved, which is divided or proposed to be divided into two (2) or more lots, parcels, sites, units, plots, or interests for the purpose of offer, sale, lease, or development either on the installment plan or upon any and all other plans, terms, and conditions, including resubdivision. Subdivision includes the division or development of residential and nonresidential zoned land, whether by deed, metes and bounds description, or other recorded instrument. However, this ordinance shall not apply to any of the following:

- a. An adjustment of lot lines as shown on a recorded plat which does not reduce the area, frontage, width, depth, or building setback lines of each building site below the minimum zoning requirements, and does not change the original number of lots in any block of the recorded plat.
- b. An allocation of land in the settlement of an estate or a decedent or a court decree for the distribution of property.
- c. The unwilling sale of land as a result of legal condemnation as defined and allowed in the Indiana State Law.
- d. Widening of existing streets to conform to the Comprehensive Plan.
- e. The acquisition of street rights-of-way by a public agency in conformance with the Comprehensive Plan.
- f. The exchange of land for the purpose of straightening property boundaries which does not result in the change of the present land usage.

SUBDIVISION, MAJOR - All subdivisions not classified as minor subdivisions, including but not limited to subdivisions of four (4) or more lots, or any size subdivision requiring any new street or extension of the local governmental facilities, or the creation of any public improvements.

SUBDIVISION, MINOR - Any subdivision containing not more than three (3) lots fronting on an existing street, not involving any new street or road, or the extension of municipal facilities, or the creation of any public improvements, and not adversely affecting the remainder of the parcel or adjoining property, and not in conflict with any provision or portion of the Comprehensive Plan, Thoroughfare Plan, Zoning Ordinance, or these regulations.

SUBDIVISION REGULATIONS OR SUBDIVISION CONTROL ORDINANCE - An ordinance for ensuring the orderly development of land by requiring coordination of new public facilities with existing facilities; and providing standards for lot layout, street design, utilities, and easements to assure compatibility with long-range Comprehensive Plan.

TEMPORARY IMPROVEMENT - Improvements built and maintained by a subdivider during construction of the subdivision and intended to be replaced by a permanent improvement prior to release of the performance bond or turnaround improvements at the ends of stub streets intended to be replaced when the adjoining area is developed and the through street connection made.

TERRAIN CLASSIFICATION - For purposes of these regulations and to guide the application of geometric design criteria, terrain has been classified as follows:

LEVEL - That condition where street sight distances, as governed by both horizontal and vertical restrictions, are generally long or could be made to be so without construction difficulty or major expense.

ROLLING - that condition where the natural slopes consistently rise above and fall below the street grade line and where occasional steep slopes offer some restriction to normal street horizontal and vertical alignment.

HILLY - that condition where longitudinal and transverse changes in the elevation of the ground with respect to a street are abrupt and where the roadbed is obtained by fragment benching or side hill excavation.

UTILITIES - Installations for transmission of water, sewage, gas, electricity, telecommunications, and storm water: and similar facilities providing service to and used by the public.

VARIANCE - A modification of the strict terms of the relevant regulations of this ordinance where such modification will not be contrary to the public interest and where, owing to conditions peculiar to the property and not the result of the action of the applicant, a literal enforcement of this ordinance would result in unnecessary and undue hardship.

YARD - A space on the same lot with a principal building, such space being open, unoccupied and unobstructed by buildings or structures from ground to sky except where encroachments and accessory buildings are expressly permitted.

ZONING ORDINANCE - The 1981 Zoning Ordinance of the City of Madison, Indiana, as amended.

NOTE: Whenever any words and phrases herein are not defined herein but are defined in the Zoning Ordinance, any such definition therein shall be deemed to apply to such words and phrases used herein.

ARTICLE III

PROCEDURE FOR SUBMISSION OF PLATS

The procedure for review and approval of a subdivision or Planned Unit Development (PUD) plat shall consist of four separate steps, in sequence: an informal discussion meeting with the Plan Commission, preparation and submission of a preliminary plat of the proposed subdivision, preparation and submission of construction plans of the proposed subdivision, and preparation and submission of a final plat of the subdivision.

SECTION A - GENERAL

1. No person proposing a subdivision shall proceed with any grading and improvements for streets or installation of public utilities until the preliminary plat and construction plans of the proposed subdivision is approved by the Plan Commission.
2. No person proposing a subdivision shall sell, agree to sell, transfer, lease, or otherwise convey any lot, parcel, or tract in a subdivision, or construct or commence the construction of any building in a subdivision until the final plat of the proposed subdivision is approved by the Commission and recorded in accordance with the provisions hereof.

SECTION B - ADVISORY MEETING WITH PLAN COMMISSION

Whenever the owner of any tract or parcel of land in the planning or corporate limits of the City intends to make a subdivision or PUD, the subdivider shall, before preparing a preliminary plat, meet and consult informally with the Plan Commission for the purpose of ascertaining the locations of proposed major streets, parks, playgrounds, school sites, and other planned projects which may affect the property being considered for the subdivision. At this meeting, the Plan Commission will identify the proposed site on the Madison Environmental Grid Map and discuss potential problems of the site with the developer. In order to assist the Commission in evaluating the proposed development, the subdivider shall submit a sketch plan to the Commission at the advisory meeting. This sketch plan shall include, as a minimum, the proposed lot layout, street layout with street names, location of adjoinment with existing streets and public utilities, and proposed subdivision name. The information provided with the sketch plan will also help the Commission ascertain which other review agencies, if any, need to be involved in the subdivision review and approval process. At the same meeting, the subdivider should review with the Plan Commission the minimum standards of subdivision design set forth in Article IV and as required by the City of Madison Construction Standards. This informal review should prevent unnecessary and costly revisions in the layout and development of the subdivision.

SECTION C - PRELIMINARY PLAT APPROVAL

After meeting informally with the Plan Commission, the subdivider shall cause to be prepared a preliminary plat as required herein.

1. Procedure

- a. Three (3) copies of the preliminary plat and required supplemental material shall be filed with the Executive Secretary of the Plan Commission, unless otherwise provided for by ordinance. Such filing shall take place at least thirty (30) days prior to a regularly scheduled meeting of the Plan Commission at which time the preliminary plat is to be considered.
- b. Preliminary plats shall generally comply with the reviewed sketch plan and specifically include any terms and conditions established at the advisory meeting.
- c. The plat shall be accompanied by an "Application for Preliminary Plat" available at City Hall and a filing fee of thirty dollars (\$30) plus twenty-five cents (\$0.25) for each lot. Such fee will be utilized to cover the cost of checking and verifying the proposed plat.
- d. Upon receipt of the application, the Plan Commission shall schedule a public hearing on the preliminary plat. Notice of such public hearing shall be advertised in two (2) local newspapers of general circulation ten (10) days prior to the hearing as required by and in accordance with I.C. 5-3-1. The applicant shall be responsible for notifying, by certified mail, all interested parties as to the date, time, place and purpose of the public hearing as required by Sections 11.37 and 11.38 of the "City of Madison Zoning Ordinance". The applicant shall file with the Commission at the time of the public hearing an affidavit so testifying along with the certified mail receipts provided by the post office.
- e. Following the public hearing and upon due consideration of the preliminary plat, the Plan Commission shall approve, disapprove or modify the proposed plat and shall impose those requirements or grant those variances in conformance with this ordinance deemed necessary and appropriate for final approval.
- f. Approval of the preliminary plat by the Plan Commission shall not constitute approval to begin improvements. Such approval shall be given only upon submittal and approval of construction plans.
- g. Where a proposed subdivision would contain no more than five (5) lots and no new streets, the procedure of preparing a preliminary plat may be waived by the Plan Commission. Adherence to the "City of Madison Construction Standards" shall still be required.

- h. The approval of the preliminary plat shall lapse unless a final plat based thereon is submitted within two (2) years from the date of such approval. An extension of time may be applied for by the subdivider and granted by the Plan Commission.
- i. One (1) copy of the preliminary plat shall be returned to the applicant with the date of approval, conditional approval, or disapproval and, when requested by the applicant, the reasons therefore accompanying the plat within thirty (30) days following the public hearing.

2. Preliminary Plat Data

Accompanying the preliminary plat, the developer will complete the form entitled "Site Environmental Assessment." This form will provide information as to the environmental grid, soil suitability, and proposed site treatment techniques.

The preliminary plat shall meet the standards of design as set forth in Article IV and shall show the following information:

- a. Scale of fifty (50) feet to one (1) inch or larger.
- b. Name of subdivision, names and addresses of the owners, the engineer or surveyor, and the owners of adjacent property.
- c. A vicinity sketch at a scale of two hundred (200) feet to one (1) inch or less.
- d. Date, approximate north point, and graphic scale.
- e. Acreage of land to be subdivided.
- f. Contours at an interval of not greater than two (2) feet or at a lesser interval if deemed necessary by the Plan Commission.
- g. Existing streams, gullies, wooded areas, buildings, and other natural or man-made features.
- h. Boundary lines of area to be subdivided and their bearings and distances.
- i. Existing and proposed easements and their locations, widths, and distances.
- j. Existing and proposed zoning on and adjacent to the tract. Existing and proposed platting of adjacent property.
- k. Existing or proposed streets on and adjacent to the tract and their names, right-of-way widths, approximate grades, and other dimensions as may be required.

- l. Lot lines with dimensions and lot numbers.
- m. Sites and their acreages, if any, to be reserved or dedicated for parks, playgrounds, schools, or other public uses.
- n. Sites, if any, for semi-public, commercial, industrial, or multi-family use. Proposed building location and internal circulation should be shown, especially the location and number of entrances onto public streets.
- o. Minimum building setback lines.
- p. Approximate locations of "ten year" and "one hundred year" flood elevations along all streams or drainage ways.

Whenever part of a tract is proposed to be subdivided and it is intended to subdivide additional parts of the tract in the future, a sketch plan for the entire tract shall be submitted to the Plan Commission at the same time the preliminary plat for the first part of the tract to be platted is submitted.

SECTION D - APPROVAL OF CONSTRUCTION PLANS

Subdivision construction plans shall be developed and submitted to the Plan Commission in accordance with the "City of Madison Construction Standards" and as specified herein.

1. Procedure
 - a. Following the approval of the Preliminary Plat and prior to submission of the Final Plat, the applicant, if he wishes to proceed with the subdivision, shall file with the Plan Commission before starting any work or improvements four (4) sets of the detailed plans and specifications thereof for approval.
 - b. The Commission shall refer these plans to the appropriate local agencies for review and comment. Once these agencies indicate their approval of the construction plans or fourteen (14) working days have elapsed without a written response, the commission shall stamp the plans approved and return one (1) set to the applicant. Revisions and resubmittals of the construction plans as required by review comments shall be at the expense of the applicant.
 - c. In no event shall final plat approval be given prior to approval of the construction plans.
 - d. It shall be the responsibility of the subdivider to submit all necessary documents, plans and specifications and filing fees to State and County regulatory agencies for consideration of approval as prescribed by their laws and regulations. Such agencies could, but not necessarily, include the Indiana Department of Environmental

Management, the Indiana Department of Natural Resources, the Indiana Department of Transportation, the Administrative Building Council and County Health Department. The commission reserves the right to withhold final acceptance of the subdivision contingent upon receiving approvals from these agencies where applicable.

- e. The installation of improvements shall be in accordance with the approved construction plans and shall be inspected by the designated City official. Such inspections are required in all instances regardless of whether the work is performed before or after final plat approval. Failure to request inspection or to proceed without proper notification to the designated official may be cause for denial of final plat approval.

2. Construction Plans Data

- a. The construction plans and specifications shall consist of all cross sections, profiles, details, material specifications, installation requirements and other engineering data necessary for the proper design and construction of the proposed improvements. The plans shall include, as a minimum, the following information.

1. Streets

Geometrics including curve data, road widths, existing and proposed contours, etc; profiles including all utility crossings and elevations; and typical cross sections of roadbeds and curbs including materials and dimensions.

2. Sanitary Sewers

Sewer plan and profiles with contours including pipe sizes and lateral locations, manhole details, lift stations (where applicable), pipe bedding details, connections to existing utilities, and material specifications.

3. Storm Sewers

Sewer plan and profiles with contours, drainage ditch cross sections, drainage structure details and material specifications.

4. Water Mains

Plan layouts of all water lines including meter, valve and hydrant locations, connections to existing utilities, typical details and material specifications.

5. Site Grading

Topographic contour mapping showing both existing and proposed grade, minimum building pad elevations and all necessary spot elevations such as ditch grades, break points, elevations between building pads, etc. Site grading plan to be at a scale of 1"=50' or larger with 2' maximum contour intervals.

6. Design Summary

A summary for basis of design in selection of water and sewer mains; storm sewer and culvert sizing including drainage area runoff calculations for the watershed area, and other pertinent design information.

- b. Construction plans and specifications shall be certified and stamped by a professional engineer and/or land surveyor holding current registration in the State of Indiana.

SECTION E - FINAL PLAT APPROVAL

The final plat shall conform substantially to the preliminary plat and construction plans as approved, and may constitute only a portion of the preliminary plat which the subdivider proposed to record and develop.

1. Procedure

- a. Following approval or conditional approval of the preliminary plat and construction plans, the applicant, if he wishes to proceed with the subdivision shall file with the Commission a request for final plat approval. The application shall be filed on forms available at the office of the Plan Commission. Such filing shall take place at least ten (10) days prior to the meeting of the Plan Commission at which it is to be considered.
- b. Three (3) black line or blue line prints and one (1) reproducible print of the final plat and the required supplementary material shall be submitted with the application.
- c. One copy of the final plat shall be transmitted to the City Engineer who will check said plat as to computations, certifications, monuments, etc., and that all the required improvements have been completed to the satisfaction of the City officials having jurisdiction, or, in the case a security bond or certified check has been posted, such is sufficient to cover the cost of the required improvements. If found satisfactory, he will return the copy of the final plat to the Plan Commission with his approval certified within ten (10) days of receipt thereof.
- d. A security (performance) bond or certified check in sufficient amount to assure such

completion of any and all remaining improvements shall be submitted to the Plan Commission with the application for final plat approval. The scheduled time of completion of improvements and installations shall be specified. It shall also be specified that upon completion, but prior to acceptance, a three year maintenance bond shall be provided for street, utility and drainage improvements to the Madison Board of Public Works and Safety.

- e. The Plan Commission shall study the said final plat to see if it conforms with the minimum standards and requirements as provided in this ordinance. If the plat meets all requirements of the subdivision regulations, and all recommendations made at the time of preliminary plat and construction plan approval have been carried out, the Plan Commission shall give final approval.
- f. Should it be determined by the Plan Commission that the final plat does not conform to the approved preliminary plat and/or the requirements of this ordinance, the subdivision shall be resubmitted to the Commission at a public hearing for final approval. Notification and advertising procedures shall be followed as previously outlined in Section C.1.d of this Article.
- g. With the exceptions of those improvements required by **Article IV**, no work shall be done on the subdivision and no lots shall be sold before the final plat is accepted and recorded.
- h. If the subdivider elects to install all improvements before application for final plat approval and it is shown that the conditions of the ordinance have been met, and if the final plat completely conforms to the approved preliminary plat, the Commission shall have no recourse but to grant final plat approval.

2. Sectionalizing Plats

- a. Prior to granting final plat approval, the Commission may permit the plat to be divided into two (2) or more sections and may impose such conditions upon the filing of the sections as it may deem necessary to assure the orderly development of the plat. The Commission may require that the performance bond be in an amount proportional to the section or sections of the plat to be filed and may defer the balance of the bond principal amount until the remaining sections of the plat are offered for filing. Such sections must contain at least twenty (20) lots or ten percent (10%) of the total number of lots contained in the approved plat, whichever is less. The approval of all remaining sections not filed with the Commission shall automatically expire two (2) years from the date of the preliminary plat approval date unless such date is formally extended.

3. Final Plat Data

- a. The plat shall be at a scale of fifty (50) feet to one (1) inch or larger.

- b. Date, title, name, and location of subdivision, graphic scale, and north arrow.
- c. All dimensions, angles, bearings, and similar data on the plat shall be tied to primary control points. Locations and descriptions of said control points shall be given, except where deemed clearly unreasonable or infeasible by the Plan Commission.
- d. Tract boundary lines, right-of-way lines of streets, easements, and other right-of-way, and property lines of residential lots with accurate dimensions to the nearest one hundredth of a foot; bearings of deflection angles, radii, arcs, and central angles of all curves with dimensions to the nearest 30".
- e. Name and right-of-way width of each street, easement, or other right-of-way.
- f. Lot numbers, lot lines, and frontage dimensions.
- g. Purpose for which sites other than residential lots are dedicated or reserved.
- h. Minimum building setback lines.
- i. Location and description of monuments.
- j. Location and description of utility and drainage easements.
- k. Location of the "ten year" and "one hundred year" flood elevations along any streams or drainage ways.
- l. Names and locations of adjoining subdivisions and streets, the location of adjoining unplatted properties, and the names and addresses of the owners of adjoining unplatted properties.
- m. Certification on plat of title showing that the applicant is the owner, that the making of the plat receives his consent and is in accordance with his desires, and a statement by such owner dedicating streets, rights-of-way, and any other sites for public use. (Form 1 as found in the Appendix.)
- n. Certification on plat by registered engineer or land surveyor as to the accuracy of survey and plat. (Form 2.)
- o. Certification by the Jefferson County Board of Health when individual sewerage disposal or water systems are to be installed. (Form 3.)
- p. Protective covenants and deed restrictions shall either be placed directly on the final plat or attached thereto in form for recording. Deviations to the plat plan shall be submitted to Plan Commission - developer shall get approval for any plat changes - developer shall submit "as built" drawings upon completion.

4. Recording of the Final Plat

- a. Upon approval of the final plat, the President and Secretary of the Commission shall sign the certificate which shall be part of the reproducible mylar of the subdivision, plus two prints of same. The two prints shall be returned to the subdivider for recording and Subdivider's copy.
- b. It shall be the responsibility of the Subdivider to file with the County Recorder one copy of the approved final plat within thirty (30) days of the final plat signature date. Failure to file within this time shall constitute a violation of this ordinance.

ARTICLE IV

GENERAL REQUIREMENTS AND MINIMUM STANDARDS FOR IMPROVEMENTS

SECTION A - GENERAL IMPROVEMENTS

1. In addition to the requirements established herein, all subdivision plats and improvements shall comply with the following laws, rules, and regulations:
 - a. all applicable federal, state, and local statutory provisions.
 - b. the City of Madison Zoning Ordinance, Building and Housing Codes, and all other applicable laws and ordinances of the appropriate jurisdictions.
 - c. the City of Madison Construction Standards.
 - d. all applicable rules and regulations of the County Health Department.
 - e. the rules and regulations of the Indiana Department of Transportation if the subdivision or any lot contained therein abut a state highway or state frontage road.
 - f. all pertinent standards contained within current planning guides published by the County or City Plan Commission.

SECTION B - PLATS CROSSING MUNICIPAL BOUNDARIES

Whenever access to the subdivision is required across land in another jurisdiction, the Commission may request assurance from the City Attorney that such access is legally established, and from the County Engineer that the access road is adequately improved, or that a performance bond has been duly executed and is of sufficient amount to insure the construction of such access road. Lot lines shall be laid out so as not to cross municipal boundary lines.

SECTION C - SUBDIVISION NAME

The proposed name of the subdivision shall not duplicate or too closely approximate phonetically the name of any other subdivision in the area covered by these regulations. The Commission shall have final authority to approve or otherwise designate the name of the subdivision which shall be determined at time of preliminary plat approval.

SECTION D - SUITABILITY OF THE LAND FOR SUBDIVISION DEVELOPMENT

1. If the Plan Commission finds that land proposed to be subdivided is unsuitable for subdivision development due to flooding, poor drainage, steep slopes, rock formations, and other such conditions as may increase the danger of health, life, or property or aggravate erosion or flood hazards; and, if from adequate investigations, conducted by all the public agencies concerned, it has been determined that in the best interest of the public the land should not be platted and developed for the purpose proposed, the Plan Commission shall not approve the land for subdivision unless adequate methods are formulated by the subdivider for meeting the problems that will be created by the subdivision and development of the land.
2. The Plan Commission may refuse to approve what it considers to be scattered or premature subdivision of land which would involve danger or injury to the public health, safety, welfare, or prosperity by reason of lack of adequate water supply, schools, proper drainage, good roads and transportation facilities, or other public services; or which would necessitate an excessive expenditure of public funds for the supply of such services (such as undue maintenance costs for adequate roads).

SECTION E - LOT IMPROVEMENTS

The following provisions shall pertain, except that modifications may be permitted in planned unit developments. Lots shall be designated by numbers. Streets, avenues, and other grounds shall be designated by names or numbers.

1. Lot Arrangement

The lot arrangement shall be such that there will be no foreseeable difficulties for reasons of topography or other conditions in securing building permits to build on each of the created lots in compliance with the Zoning Ordinance and local health regulations. Driveway access shall be provided for each building on such lots from the appropriate approved street. Except where not feasible, side lot lines shall be at right angles to straight street lines and radial to curved street lines.

2. Lot Dimensions

The size, shape, and lot dimensions within the jurisdiction of this ordinance shall conform to the minimum requirements of the Zoning Ordinance. Where lots are more than double the minimum required area for the zoning district, the Commission may require that such lots be arranged so as to allow further subdivision and the opening of future streets where they would be necessary to serve all potential lots. Dimensions of corner lots shall be large enough to allow for erection of buildings when observing the minimum front yard setback from both streets. Depth and width of properties reserved or laid out for business, commercial, or industrial purposes shall be adequate to provide

for all off-street parking and loading facilities as may be required by the Zoning Ordinance.

3. Building Line Setback

The building line to establish yards for all buildings and lots shall be as provided in the Zoning Ordinance.

4. Yard Requirements

Yard requirements for residential subdivisions or the portions thereof within the jurisdiction of this ordinance shall be the same as the yard requirements set forth in the Zoning Ordinance for the zoning district or districts in which they are located.

5. Double Frontage Lots and Access to Lots

- a. Double Frontage Lots. Double frontage and reversed frontage lots shall be avoided except where necessary to provide for the separation of residential development from the traffic on bordering arterials or to overcome specific disadvantages of topography and orientation affecting the subdivided lots.
- b. Access from Primary and Secondary Arterials. Lots shall not, in general, derive access from a primary or secondary arterial street. Where driveway access from a primary or secondary arterial street may be the only possible access for several adjoining lots, the Commission may require that such lots be served by a combined access drive in order to limit possible traffic hazards from multiple access to such streets. Where possible, driveways should be designed and arranged so as to avoid requiring vehicles to back into traffic on primary or secondary arterials.

6. Lot Drainage

Lots shall be laid out so as to provide positive drainage away from all buildings and individual lot drainage shall be coordinated with the general storm water drainage pattern for the area. Drainage shall be designed so as to avoid the accumulation of storm water on any one or more lots from adjacent lots. It shall be the responsibility of the lot owner to maintain the lot grade, as it applies to drainage, as provided for in the approved construction plans.

7. Debris and Waste

No cut trees, timber, debris, earth, rocks, stones, soil, junk, rubbish, or other waste material of any kind shall be buried in any land, or left or deposited on any lot or street at the time of occupancy within a subdivision, nor shall any be left or deposited in any area of the subdivision at the time of expiration of the performance bond or dedication of public improvements, whichever is sooner.

8. Fencing

Each subdivider and/or developer shall be required to furnish and install fences wherever the Commission determines that a hazardous condition may exist. The fences shall be constructed according to the Construction Standards and shall be noted as to height and material on the final plat. No certificate of occupancy shall be issued until said fence improvements have been duly installed.

9. Waterbodies and Watercourses

If a tract being subdivided contains a water body, or portion thereof, lot lines shall be so drawn as to distribute the entire ownership of the water body among the fees of adjacent lots. The Commission may approve an alternative allocation of interests whereby the ownership of and responsibility for safe maintenance of the water body is so placed that it will not become a local government responsibility. No part of the minimum area of a lot required under the Zoning Ordinance may be satisfied by land which is under water. Where a watercourse separates the buildable area of a lot from the street from which it has access, provisions shall be made for installation of a culvert or other structure, of a design approved by the Commission.

10. Flood Hazards

- a. Land subject to flooding and land deemed to be topographically unsuitable for residential development shall not be platted for residential use or for any other use which may increase the danger of health, life, or property or aggravate erosion or flood hazards. Such land within the subdivision shall be set aside on the plat for such uses as will not be endangered by periodic or occasional inundation contrary to the public welfare. To insure that lots will be located only where they will provide flood-free house sites, the Plan Commission may require the subdivider to provide elevation and flood profiles sufficient to demonstrate that the house sites will be completely free from the danger of flooding.
- b. If a stream flows through or adjacent to the proposed subdivision, the plat plan shall provide for an easement or right-of-way along the stream for a floodway. For smaller streams, those in which the floodway for a 100 year flood is 50 feet wide or less, the plan shall also provide for channel improvement to enable them to carry all reasonable floods within banks. The floor elevations of houses shall be high enough to be a minimum of two feet (2') above the 100 year flood. The floodway easement shall be wide enough to provide for future enlargement of the stream channel as adjacent areas become more highly developed and runoff rates are increased.

SECTION F - MONUMENTS

1. Monuments shall be a steel pin encased in concrete. The steel pin shall be ½" diameter and 30" long. Concrete encasement shall consist of 6" diameter pier 24" long. The top of the steel pin centered in the concrete shall be ¼" above top of concrete.
2. Monuments shall be placed:
 - a. So that the scored or marked point shall coincide exactly with the intersection of the lot or property line at that point and shall be set so that the top of the monument is level with the surface of the surrounding ground;
 - b. At the intersection of all angles in the boundary line of the survey;
 - c. At intersection of street property lines;
 - d. At the beginning and ending of all curves where street and alleys are so laid out;
 - e. At all points where lot lines intersect such curves both front and rear;
 - f. At all angles in property lines of streets and alleys.
3. The corners of all lots not marked by monuments as hereinbefore required shall be marked by galvanized or wrought iron pipe, or iron or steel bars at least 30 inches in length and not less than one (1) inch in diameter, the top of the pipe or bar to be set level with the surrounding ground.

SECTION G - STREETS

1. General
 - a. No Subdivision shall be approved unless the area to be subdivided includes frontage on or access from an existing street as designated by the City street map and providing such street has existing public right-of-way allowing public access to the subdivided area.
 - b. Streets shall be graded and improved in accordance with the Construction Standards, the approved construction plans, and as provided herein.

2. Topography and Arrangement

- a. Streets shall be related appropriately to the topography. All streets shall be arranged so as to obtain as many as possible of the building sites at, or above, the grades of the streets. Grades of streets shall conform as closely as possible to the original topography. A combination of steep grades and sharp curves shall be avoided.
- b. All arterials and collector streets shall be properly related to special traffic generators such as industries, business districts, schools, churches, and shopping centers, to population densities; and to the pattern of existing and proposed land uses.
- c. Minor or Local streets shall be laid out to conform as much as possible to the topography, to discourage use by through traffic, to permit efficient drainage and utility systems, and to require the minimum number of streets necessary to provide convenient and safe access to the property.
- d. In business and industrial developments, the streets and other accessways shall be planned in connection with the grouping of buildings, location of rail facilities, and the provision of alleys, truck loading and maneuvering areas, walkways, bikeways, and parking areas so as to minimize conflict of movement between the various types of vehicular and pedestrian traffic.

3. Street Extensions

- a. The street layout of the proposed subdivision shall provide for the continuation or projection of streets and alleys already existing in areas adjacent to the area being subdivided.
- b. Where, at the determination of the Plan Commission, it is desirable to provide street access to adjoining properties, proposed streets shall be extended by dedication to the boundaries of such properties. Where the Plan Commission deems it necessary, such dead-end streets shall be provided with a temporary turn-around approved by the Plan Commission.
- c. The street system for the proposed subdivision shall provide for extending existing streets at the same or greater width, but in no case shall a street extension be of less width than the minimum width required in these regulations for a street in its category.

4. Dedication of Right-of-Way for new streets

- a. The dedication of right-of-way for new streets measured from lot line to lot line shall be as shown in **Table IV-1**.

Table IV-1
Design Standards for Streets

	<u>Arterial Streets</u>	<u>Collector Streets</u>	<u>Local Streets</u>	<u>Cul-de-Sac</u>	<u>Alley</u>
Right-of-Way Width	90 Ft.	70 Ft.	50 Ft.	50 Ft.	24 Ft.
Minimum Street Width ⁽¹⁾	48 Ft.	36 Ft.	26 Ft.	26 Ft.	14 Ft.
Maximum Grade	5%	7%	7%	7%	7%
Minimum Grade	0.5%	0.5%	0.5%	0.5%	0.5%
Min. Angle for Intersection	90°	80°	70°	70°	70°
Min. Corner Radius	30 Ft.	25 Ft.	20 Ft.	20 Ft.	20 Ft.
Horizontal Curve Minimum Radius	400 Ft.	200 Ft.	100 Ft.	100 Ft.	100 Ft.
Vertical Curve Minimum Sight Distance	500 Ft.	300 Ft.	200 Ft.	100 Ft.	100 Ft.
Curve Length ⁽²⁾					
SAG	70 x A	40 x A	40 x A	40 x A	
Crest	80 x A	30 x A	30 x A	30 x A	
Min. Tangent Length between reverse curves	200 Ft.	100 Ft.	100 Ft.	100 Ft.	100 Ft.

(1) Street width is defined as the distance from back of curb to back of curb. Where curb and gutter is not required, minimum street width can be reduced by two (2) feet.

(2) Vertical curve length is defined by multiplying the algebraic difference (A) in grade by the value shown in the Table.

- b. All streets classified as arterial streets by the Transportation Plan shall have all points of access approved by the Plan Commission. Marginal access streets or frontage roads may be required by the Commission for subdivisions fronting on arterial streets.
- c. Through business areas, street widths shall be increased ten (10) feet on each side if needed to provide parking without interfering with normal traffic patterns.

5. Dedication of Right of Way for Existing Streets

Subdivisions platted along existing streets after the effective date of this ordinance shall dedicate additional right-of-way if necessary to meet the minimum street width requirements set above for new subdivision streets.

- a. The entire minimum right of way width shall be dedicated where the subdivision is located on both sides of the existing street. When the subdivision is located on only one side of an existing street, one-half (1/2) the required right-of-way width, measured from the center line of the existing roadway, shall be dedicated.
- b. Dedication of one-half (1/2) of the rights-of-way for proposed streets along the boundaries of land proposed for subdivision shall be prohibited.

6. Street Grades and Elevations

- a. All streets shall be designed so as to provide for the discharge of surface water from the pavement and right-of-way by grading and drainage. Street grades and curvatures shall be as listed in **Table IV-1**.
- b. The Plan Commission will not approve any streets which will be subject to inundation or flooding. All streets must be located at elevations which will make them flood free in the event of a 100 year flood. Fill may be used in areas subject to flooding in order to provide flood-free streets if such fill does not unduly increase flood heights and where allowed by and in accordance with any applicable rules and regulations of the Indiana Department of Natural Resources. Drainage openings under any streets shall be designed so as not to restrict the flow of water thereby unduly increasing flood heights.

7. Intersections

- a. In general, all streets shall join each other so that for a distance of at least 100 feet the street is approximately at right angles to the street it joins.
- b. Intersections shall be designed with a flat grade wherever practical. In hilly or rolling areas, at the approach to an intersection a leveling area shall be provided having a two percent (2%) maximum grade at least sixty (60) feet in distance measured from the nearest right-of-way line of the intersecting street.
- c. No lot or other parcel of land which abuts on and has access to either a collector or a local access street shall have a service drive, curb cut, or other means of access to an arterial street within fifty (50) feet of the right-of-way of any street which intersects such arterial street on the side on which such lot or parcel is located.

8. Gutters and Curbs

- a. Gutters and curbs shall not be required for streets in subdivisions designed for two and one half (2.5) dwelling units or less per acre of ground within the boundaries of the plat.
- b. Gutters and curbs shall be required for all streets in subdivisions as designed for more than two and one half (2.5) dwelling units per acre of ground within the boundaries of the plat.
- c. Gutters and curbs may be required in the case of marginal access streets.
- d. Gutters and curbs may be integral concrete curb or combined gutter and curb type and may be designed with either straight or rolled curb section.

9. Dead-Ends and Cul-de-Sacs

- a. Dead end streets shall not be allowed unless specifically approved by the Plan Commission. Where allowed, dead end streets shall not exceed eight hundred (800) feet in length.
- b. Minor terminal streets or courts (cul-de-sacs) which are designed so as to have one end permanently closed shall not be longer than eight hundred (800) feet. Such streets shall be provided at the closed end with a turnaround having a radius at the outside of the pavement of at least forty (40) feet and a radius at the outside of the right-of-way of at least fifty (50) feet. The cul-de-sac shall be a geometric shape so as to contain an eighty (80) foot diameter minimum circle.

10. Street Names

- a. The proposed name of the subdivision shall not duplicate, or too closely approximate phonetically, the name of any other subdivision in the area covered by these regulations. The Plan Commission shall have final authority to approve the name of the subdivision which shall be determined at the time of sketch plat approval.
- b. Street names shall not duplicate any existing name within the area covered by these regulations, except where a new street is a continuation of an existing street. Street names that may be spelled differently but sound the same as existing streets shall not be used. The Plan Commission shall have final authority to approve the names of streets which shall be determined at the time of sketch plat approval.

11. Private Streets and Reserve Strips

- a. There shall be no private streets platted within a subdivision.

- b. There shall be no reserve strips in a subdivision except where their control is rested in the City or County under conditions approved by the Plan Commission as authorized in these regulations.

12. Access to Collector Streets

Where possible, lots in single family residential subdivisions fronting on collector streets shall be avoided and lots at the corners of intersections between local and collector streets shall front on the local street and have driveway access to it only and not to the collector street. In multiple family residential areas entrances to group parking lots shall have access only to local streets (where possible) and such entrances shall be widely spaced.

13. Access to Primary Arterials

Where a subdivision borders on or contains an existing or proposed primary arterial, the Commission may require that access to it be limited by one of the following means:

- a. the subdivision of the lots so as to back onto the primary arterial and front onto a parallel local street; no access shall be provided from the primary arterial and screening shall be provided within a strip of land along the rear property line of such lots;
- b. a series of cul-de-sacs, or loop streets entered from, and designed generally to be at right angles to an access street that is at some distance from and parallel to the arterial street, with the rear lines of their terminal lots backing onto the arterial; and,
- c. a marginal access or service road (separated from the primary arterial by a landscaped and/or decoratively fenced grass strip and having access thereto at widely spaced suitable points).

14. Street Regulatory Signs

The applicant shall provide and install a street sign at every street intersection within his subdivision. The City shall inspect and approve all street signs before issuance of certificates of occupancy for any residence on the approved streets.

15. Street Lights

Installation of street lights shall be required in accordance with the Construction Standards.

16. Railroads and Limited Access Highways

Railroad rights-of-way and limited access highways where so located as to affect the subdivision of adjoining lands shall be treated as follows.

- a. In residential districts a buffer strip at least 25 feet in depth in addition to the normal depth of the lot required in the district shall be provided adjacent to the railroad right-of-way or limited access highway. This strip shall be part of the platted lots and shall be designated on the plat: "This strip is reserved for screening. The placement of structures hereon other than earth berms, walls, fences and other landscape screening devices approved by the Commission is prohibited."
- b. In districts zoned for business, commercial, or industrial uses, the nearest street extending parallel or approximately parallel to a railroad shall, wherever practical, be at a sufficient distance therefrom to ensure a suitable depth for commercial or industrial sites.
- c. Streets parallel to a railroad when intersecting a street which crosses the railroad at grade shall, to the extent practicable, be at a distance of at least 150 feet from the railroad right-of-way. Such distance shall be determined with due consideration of the minimum distance required for future separation of grades by means of appropriate approach gradients.

SECTION H - BLOCKS

1. Length

Block lengths shall not exceed one thousand three hundred twenty (1,320) feet or be less than four hundred (400) feet, except as the Plan Commission considers necessary to secure efficient use of land or desired features of street layout. Blocks along arterials and collector streets shall not be less than one thousand (1000) feet in length.

2. Width

Blocks shall be wide enough to allow two (2) tiers of lots of minimum depth. However, where topographical conditions or the size of the property prevent two (2) tiers of lots, the Plan Commission may approve a single tier of lots of minimum depth. Double frontage lots, however, should be discouraged.

3. Special Conditions

In blocks of over seven hundred fifty (750) feet in length, the Commission may require, at or near the middle of the block, a public walk connecting adjacent streets or other public areas; such walks shall be at least ten (10) feet in width and shall be intended for the use of pedestrians only.

SECTION I - COMMUNITY ASSETS

In all subdivisions, due regard shall be shown for natural features such as large trees, unusual rock formations, and water courses; for sites which have historical significance; and for similar assets which, if preserved, will add attractiveness and value to the subdivision and to the community.

SECTION J - PUBLIC OPEN SPACES

1. A minimum of four percent (4%) of the gross area of any subdivision shall be reserved for parks and playground sites. Park and playground sites shall be dedicated to the City to be reserved for public use. The Plan Commission, however, shall have the option to determine whether to accept the park site or a contribution to the park and recreation fund of the City in a sum of money equal to the fair market value of the park area. the sum of money collected shall be placed in the park fund of the City to provide recreational areas and facilities.
2. In the event the City accepts that dedication of land as park and playground sites, the following standards shall apply:
 - a. No local open space may be less than twenty thousand (20,000) square feet in area, nor larger than twelve (12) acres (except when stream valley parks, storm drainage, utility easements, or green buffers are included with the written permission of the Plan Commission), or as provided below.
 - b. Any area or segment of an open space less than one hundred (100) feet in width cannot be calculated as local open space unless it is clearly part of an overall open space system. For example, a linear pedestrian system linking larger, open spaces could be included in the calculation.
 - c. A lower minimum than twenty thousand (20,000) square feet or a higher maximum than twelve (12) acres may be authorized by the Plan Commission, particularly if practical difficulties or unusual hardship would be entailed by the application of the required standards. Such difficulties may include cases in which one area somewhat greater than twelve (12) acres will clearly give better use than two areas of less than twelve (12) acres each.
 - d. Developers of adjoining subdivisions may cooperate in allocating open space for joint use by all residents of the subdivisions concerned. Where this is done, size, location, and design are subject to Plan Commission approval.
 - e. Required local open space must meet the definition of usable open space. Land in public utility easements may be included in the open space provision to the full extent that the use of the land is not restricted for recreation purposes. To the extent that it is restricted, additional land must be designated by the developer.

3. At the discretion of the Planning Commission, the requirement for dedicated parks and playground areas may be waived based on specific circumstances such as proximity to existing parks and recreational facilities. If desired, it shall be the responsibility of the subdivider to request such a waiver at time of preliminary plat submittal.

SECTION K - PLANNED UNIT DEVELOPMENTS

The design standards of this ordinance may be modified by the Commission in the case of a plan utilizing an unusual concept of development which meets the requirements of this section. The planned unit development provision is intended to encourage original and imaginative subdivision design which preserves the natural amenities of the site and provides for the general welfare of the City.

1. The unit plan shall be consistent with the spirit and intent of this ordinance.
2. The unit plan shall conform to the "Planned Unit Development" requirements of the City Zoning Ordinance.
3. The area of land to be developed shall not be less than ten (10) acres.
4. Properties adjacent to the planned unit shall not be adversely affected.

SECTION L - UTILITY EASEMENTS

All proposed plats submitted for Commission approval under the provisions of this ordinance shall allocate areas of suitable size and location, wherever necessary, for utility easements. In general, street rights-of-way and/or fifteen foot (15') easements centered along rear lot lines shall be provided for this purpose. No structures of any kind other than those related to the utilities shall be constructed on easements.

SECTION M - SIDEWALKS

Sidewalks shall be provided in all residential subdivisions with a planned density of two (2) or more dwelling units per acre. Sidewalks shall be constructed along at least one side of all local streets and along both sides of collector and arterial streets.

SECTION N - CULVERTS

1. Culverts shall be installed wherever necessary to allow for adequate drainage under streets, driveways and other structures.

2. Use of culverts will be required at all driveways constructed across open drainage ditches. Driveway culverts will be sized as required for the actual drainage flows but in no case shall be less than twelve inches (12") in diameter.

SECTION O - DRAINAGE AND STORM SEWERS

1. General Requirements

The Commission shall not recommend for approval any subdivision plat which does not make adequate provision for storm or flood water runoff channels or basins. The storm water drainage system shall be separate and independent of any sanitary sewer system. Storm sewers, where required, shall be designed by the Rational Method, or other methods as approved by the Commission and a copy of the design computations shall be submitted along with the plans. Inlets shall be provided so that surface water is not carried across or around any intersection, nor for a distance of more than 600 feet in the gutter or when the encroachment of storm water into the street disrupts traffic. When calculations indicate that curb capacities are exceeded at a point, no further allowance shall be made for flow beyond that point and catch basins or inlets shall be used to intercept flow at that point.

2. Nature of Storm Water Facilities

a. Location

The subdivider may be required by the Commission to carry away by pipe or open ditch any spring or surface water that may exist, either previously to, or as result of the subdivision. Such drainage facilities shall be located in the street right-of-way where feasible, or in perpetual, unobstructed easements of appropriate width.

b. Accommodation of Upstream Drainage Areas

A culvert or other drainage facility shall in each case be large enough to accommodate potential runoff from its entire upstream drainage area, whether inside or outside the subdivision. The City Engineer shall approve the necessary size of the facility as determined by the subdivider, based on the provisions of the required construction standards and specifications assuming conditions of maximum potential watershed development permitted by the Zoning Ordinance.

c. Drainage Design Criteria

The subdivider shall size all storm sewers, culverts, ditches and other drainage structures based on runoff from a ten (10) year storm event. The drainage calculations shall also include the effect of the subdivision on the existing downstream drainage facilities outside the subdivided area. Where it is determined that runoff incidental to the development of the subdivision will overload an existing downstream

drainage facility during a five (5) year storm, the Plan Commission shall not approve the subdivision until provisions have been made for the improvement of said condition.

d. Floodway Areas

If a subdivision of land is proposed within the Flood Plain, Floodways shall be preserved and not diminished in capacity by filling or obstruction, except as approved by the Indiana Natural Resources Commission in writing. No residential building site may be located within the Floodway.

e. Floodway Fringe Areas

Where a subdivision is proposed within an area of the Flood Plain designated as a Floodway Fringe the Commission may approve such subdivision provided that: all streets are elevated sufficiently to be above the Regulatory Flood elevation; all lots for residential usage have a Flood Protection Grade two (2) feet above the Regulatory Flood elevation; where provided, water and sanitary sewer facilities are constructed to eliminate contamination of or by, flood water; and, approval to fill the area from the Indiana Natural Resources Commission has been obtained in writing. Lands below the Regulatory Flood elevation shall not be used for computing the area requirement for any lot.

f. Flood Plain Areas

Where a subdivision is proposed within an area of the Flood Plain for which Floodway and Floodway Fringe designations have not been made, the Commission shall not approve such a subdivision unless all streets are raised sufficiently to be above the Regulatory Flood elevation; all lots for residential usage have a Flood Protection Grade of two (2) feet above the Regulatory Flood elevation; where provided, public water and sanitary sewer facilities are constructed to eliminate contamination of or by flood water; and, filling to achieve the above will not raise the level of the Regulatory Flood Elevation more than one-tenth (1/10) of one (1) foot for that reach of the stream. All filling in the Flood Plain must be approved in writing by the Indiana Natural Resources Commission. Lands below the Regulatory Flood elevation shall not be used for computing the area requirement for any lot.

g. Recording of Plats in the Flood Plain and Floodway Fringe

All final plats having within their boundaries areas whose elevation is below that of the Regulatory Flood Elevation shall show and label the Regulatory Flood Boundary and elevation, as of the date the final plat is drawn on the final plat for recording.

SECTION P - DEDICATION OF DRAINAGE EASEMENTS

1. Where topography or other conditions are such as to make impractical the inclusion of drainage facilities within street rights-of-way, perpetual unobstructed easements at least fifteen (15) feet in width for such drainage facilities shall be provided across property outside the right-of-way lines and with satisfactory access to the street. Easements shall be indicated on the plat. Drainage easements shall be carried from the street to a natural watercourse or to other drainage facilities.
2. The applicant shall dedicate, either in fee or by drainage or conservation, easement land on both sides of existing watercourses of a width to be determined by the Commission and, in the case of legal drains, the County Drainage Board.

SECTION Q - WATER SUPPLY IMPROVEMENTS

1. Where the public water supply is reasonably accessible or available to the proposed subdivision, as determined by the Plan Commission, the subdivider shall construct a complete water distribution system which shall adequately serve all lots, which shall include appropriately spaced fire hydrants, and which shall be properly connected with the public water supply system. Where a public water supply system is not reasonably accessible to the subdivision, the subdivider shall be required to install alternate water supply facilities approved by the City Engineer. Where individual lot wells are to be installed, lot dimensions shall meet the approval of the Jefferson County Board of Health. In any case, water supply facilities shall be installed as required by standards and specifications as approved by the Jefferson County Board of Health.
2. Unless specifically approved otherwise, all water lines shall be placed so as to have a minimum ground cover of three and one-half (3.5) feet.
3. Design of water supply systems shall be in accordance with the Construction Standards and as recommended by the latest edition of the "Recommended Standards for Water Works" as published by the Health Education Service, Albany, New York.

SECTION R - SANITARY SEWER IMPROVEMENTS

1. The subdivider shall construct a complete sanitary sewer system which shall adequately serve all lots and which shall be properly connected to the public sanitary sewer system. Where a public sanitary sewer system is not reasonably accessible to the subdivision, the subdivider shall install alternate sanitary sewer facilities which shall be approved by the Plan Commission and the Jefferson County Health Officer. In any case, sanitary sewer facilities shall be installed as required by standards and specifications as approved by the Indiana Department of Environmental Management.

2. No connection draining storm water runoff including roof drains or basement sumps shall be made to a sanitary sewer.
3. Design of sanitary sewer systems shall be in accordance with the Construction Standards and as recommended by the latest edition of the "Recommended Standards for Wastewater Facilities" as published by the Health Education Service, Albany, New York.
4. The use of lift stations in the design of the sanitary sewer system shall be avoided wherever possible and practical. The inclusion of lift stations shall be subject to specific approval of the Board of Public Works.
5. Selected Design Criteria
 - a. Locations - Sanitary sewers shall be located within street or alley rights-of-ways unless topography dictates otherwise. When located in easements on private property, access shall be provided to all manholes. Unless specifically approved otherwise, sanitary sewer manholes shall not be located within drainage ditches, swales or other defined drainage areas.
 - b. Manholes - Manholes shall be installed at the end of each line, at any change in direction, and at distances not greater than 450 feet on straight sections of sanitary sewer lines. The use of cleanouts other than as required on service laterals shall not be allowed.
 - c. Cover - Unless specifically approved otherwise due to topography or limitations caused by connection to existing sewers, the minimum cover on sanitary sewers shall be six (6) feet in streets and alleys and four (4) feet in all other areas.
 - d. Laterals - Service laterals shall be provided to each lot proposed by the subdivider. A manufactured wye connection shall be installed on the mainline sewer for the purpose of connecting service laterals. The minimum size of service laterals shall be six (6) inches diameter.

ARTICLE V

ASSURANCE FOR COMPLETION OF IMPROVEMENTS

SECTION A - COMPLETION OF IMPROVEMENTS

Before the final plat of any subdivided area shall be approved, signed, and recorded, the subdivider shall construct all improvements as required by **Article IV** of this ordinance and in accordance with the approved preliminary plat and construction plans except as allowed by Section B below. Improvements shall include construction of all streets, sidewalks, utilities and grading as required to properly develop the building lots. Improvements shall be performed to the satisfaction of the Commission.

SECTION B - POSTING OF BONDS

1. At the discretion of the Commission, the requirements for completion of improvements as described above may be waived provided that the subdivider post a performance bond in an amount equal to one hundred percent (100%) of the value of any improvements remaining to be completed. The value of such work shall be established by the Commission based on a reasonable estimate of construction costs. The bond shall be securable to the City of Madison and is intended to provide reasonable assurance to the City of the satisfactory construction of the uncompleted portion of the required public improvements. Under the provisions of accepting a performance bond, the City shall require the applicant to enter into a contract guaranteeing completion of all public improvements within one (1) year of posting of the bond.
2. In lieu of a performance bond, the applicant may provide the City with a certified check in an amount equal to one hundred percent (100%) of the estimated cost of completion of the uncompleted portion of required public improvements.
3. In the event of unforeseen circumstances, an additional time period for development beyond the one year requirement may be negotiated.
4. A performance bond furnished pursuant to this ordinance shall comply with all statutory requirements and shall be satisfactory to the City Attorney as to form, sufficiency, and manner of execution as set forth in this ordinance.

SECTION C - VARIANCES

1. Exceptional Condition

The Plan Commission may grant a variance to this ordinance where, by reason of the unusual shape of a specific piece of property, or where, by reason of exceptional topographical conditions, the strict application of these regulations would result in extreme practical difficulties and undue hardship upon the owner of such property; provided, however, that such relief may be granted without detriment to the public good and without substantially impairing the intent and purpose of this ordinance. In granting such variances or modifications, the Plan Commission may require such conditions as will substantially secure the objectives of the standards or requirements so varied or modified. Financial disadvantage to the property owner is not proof of hardship within the purpose of this ordinance.

ARTICLE VI

ADMINISTRATION

SECTION A - INSPECTION

1. When the Construction plans have been approved as provided in this ordinance, the subdivider shall first notify the Building Commissioner of his intention to proceed with the construction and installation of improvements. Notification shall be made at least twenty-four (24) hours before any such construction or installation shall commence so as to give the Building Commissioner an opportunity to inspect the site prior to commencement of work and to inspect installation or construction of said streets and improvements during the course of work being performed. In order to defray a part of the costs incurred by the City in inspecting the installation of the improvements required by this ordinance, the subdivider shall, before he proceeds with any construction or installation, present a certified check or money order made payable to the City in an amount equal to one percent (1%) of the estimate of the cost of improvements, provided the minimum fee is \$50.00.
2. The Building Commissioner shall have the right to periodically inspect the required improvements during construction to insure their satisfactory completion.
3. If the Building Commissioner finds upon inspection that any of the required improvements have not been constructed in accordance with the accepted construction standards and specifications, the subdivider shall be responsible for removal and replacement of said improvements. Whenever the cost of improvements is covered by a performance bond, the subdivider and the bonding company shall be severally and jointly liable for completing the improvement according to specifications.

SECTION B - ACCEPTANCE OF CONSTRUCTION

After streets and improvements have been installed and constructed pursuant to the requirements contained in this ordinance, and in the event that the subdivider desires to have the City accept said streets or improvements, the subdivider shall notify the Plan Commission that the construction or installation has been completed, and shall supply the City with a minimum of four (4) copies of the as-built plan on which the street or improvement in question has been constructed or installed. The four (4) copies of the plan shall show thereon the signatures of all agencies and individuals who have approved the plan and contain a notice thereon as to where and when the plan was recorded in the office of the County Recorder. The portion of street or improvement which the subdivider desires to have the City accept shall be shaded or colored on each of the four copies. The plan shall also clearly designate the number of lineal feet of said street or improvement which the subdivider desires to be accepted by the City.

SECTION C - RELEASE OR REDUCTION OF PERFORMANCE BOND

1. The Plan Commission shall not recommend to the Board of Public Works and Safety the acceptance of proposed dedicated improvements, nor release nor reduce a performance bond, until the Plan Commission has submitted a certificate stating that all required improvements have been satisfactorily completed and until the subdivider's engineer has certified to the Plan Commission that the layout of all public improvements is in accordance with construction plans for the subdivision. The Board of Public Works and Safety shall thereafter accept the improvements for dedication in accordance with the established procedure.
2. Prior to any street, or other improvement being accepted by the City as hereinafter provided, the subdivider shall post a Maintenance Bond and/or other security naming the City as Obligee in an amount deemed adequate by the City to insure maintenance of said improvements for a period of at least thirty-six (36) months from the date of acceptance by the City.

SECTION D - ENFORCEMENT OF VIOLATIONS

1. The Building Commissioner shall enforce these regulations and bring to the attention of the City Attorney any violations or lack of compliance herewith.
2. No owner, or agent of the owner, of any parcel of land located in a proposed subdivision shall transfer or sell any such parcel before a plat of such subdivision has been approved by the Plan Commission, in accordance with the provisions of these regulations, and filed with the County Recorder.
3. No public board, agency, commission, official, or other authority shall proceed with the construction of or authorize the construction of any of the public improvements required by these regulations until the proposed subdivision has been approved by the Plan Commission in accordance with these regulations.
4. No building permit shall be issued for the construction of any building or structure located on a lot or plat subdivided or sold in violation of the provisions of these regulations.
5. The City Attorney may, in addition to taking whatever criminal action deemed necessary, take steps to civilly enjoin any violation of these regulations.

SECTION E - PENALTIES

1. Penalties for failure to comply with the provisions of these regulations shall be as follows: "Violation of any of the provisions of these regulations or failure to comply with any of its requirements shall constitute a misdemeanor. Each day such violation continues shall be considered a separate offense. The land owner, tenant, subdivider, builder, public official or

any other person who commits, participates in, assists in, or maintains such violation may be found guilty of a separate offense. Nothing herein contained shall prevent the Plan Commission or any other public official or private citizen from taking such lawful action as is necessary to restrain or prevent any violation of these regulations."

2. Any person, firm, or corporation who violates any of these regulations shall be guilty of a misdemeanor and, upon conviction, shall be fined not less than ten dollars (\$10.00) and not more than three hundred dollars (\$300.00), per each occurrence per day.

SECTION F - REPEAL OF CONFLICTING REGULATIONS, EFFECTIVE DATE AND ENACTMENT

All other subdivision regulations or parts of thereof in conflict with these regulations are hereby repealed to the extent necessary to give these regulations full force and effect. These regulations shall become effective on _____, 1994.

Passed and adopted by the City Council of the City of Madison, Indiana, on the ____ day of _____, 1994.

CITY COUNCIL

These regulations approved by me, Morris Wooden, Mayor of the City of Madison, Indiana, this ____ day of _____, 1994.

Morris Wooden, Mayor

Attest: _____

Clerk-Treasurer

SITE ENVIRONMENTAL ASSESSMENT FORM

(To be completed by subdivider)

	Yes	No
• SITE WITHIN 100 YEAR FLOODPLAIN	—	—
• SITE WITHIN HILLSIDE AREA	—	—
• SITE CONTAINS AT LEAST A ONE ACRE CONCENTRATION OF TREES	—	—
• SITE CONTAINS EITHER CREEK, STREAM OR LAKE	—	—
• SITE CURRENTLY HAS POOR DRAINAGE	—	—
• SITE CURRENTLY USED FOR AGRICULTURAL PURPOSES	—	—

SITE TREATMENT TECHNIQUES TO ALLEVIATE ENVIRONMENTAL LIMITATIONS

PRELIMINARY PLAT - CHECK LIST

Name of Subdivision_____

Location_____

Zoning District_____

Owner_____

Address_____Tel._____

Surveyor or Engineer_____Registration
Number:_____

Address_____Tel._____

Date Submitted for Preliminary Plat Approval_____

Check List

_____ copies submitted thirty (30) days prior to meeting.

_____ copies sent to City Building Commissioner, Telephone Company, Gas Company,
and Power Company and other utilities for recommendations.

_____ copies of private deed restriction, if any.

_____ map (drawn to scale of not less than 1" equals 50') contents:

_____ Tract designation according to the real estate records of the county.

_____ Vicinity sketch at a scale of two hundred feet or less.

_____ Name and location of subdivision.

_____ Names of adjoining owners and/or subdivisions.

_____ Date, north arrow, and graphic scale.

_____ Acreage of land to be subdivided.

_____ Boundary lines of tract to be subdivided.

_____ Proposed lot lines and lot numbers.

- _____ Location, widths, and names of all existing or platted streets or other public ways and easements, established triangulation points, or other established survey corners or lines, and other important features such as existing permanent buildings, large trees, water courses, railroad lines, etc.
- _____ Existing sewers, water mains, culverts, and other underground structures within the tract and immediately adjacent thereto, with pipe sizes and grades indicated.
- _____ Contours, normally with intervals of two feet referenced to the city datum, or as may be required by the Plan Commission.
- _____ The layout, proposed names, and widths of proposed streets, alleys, and easements, the location and approximate sizes of proposed catch basins, culverts, and other drainage structures; the layout, numbers and approximate dimensions of proposed lots.

Approved _____ to proceed to final plat.
(Date)

Subject to following modifications: _____

Variance granted: _____

Disapproved _____ for the following reasons:
(Date)

SUGGESTED FORMS FOR FINAL PLAT CERTIFICATION

Form 1 CERTIFICATE OF OWNERSHIP, CONSENT, AND DEDICATION
(on plat)

I (we) hereby certify that I am (we are) the owner(s) of the property shown and described hereon and that I (we) hereby adopt this plan of subdivision with my (our) free consent, and in accordance with my (our) desire, dedicate all streets, alleys, walks, parks, and other open spaces to public or private use as noted.

_____ 19__

Owner

Owner

Form 2 CERTIFICATE OF ACCURACY
(on plat)

I hereby certify that the plan shown and described hereon is true and correct survey to the accuracy required by the Madison, Indiana, Plan Commission, and that the monuments have been placed as shown hereon, to the specifications of the Building Inspector.

_____ 19__

Engineer/Surveyor

Registration Number

Form 3
(on plat)

CERTIFICATE OF THE APPROVAL OF WATER AND SEWERAGE SYSTEMS

I hereby certify that the water supply and sewage disposal utility systems installed, or proposed for installation, in the subdivision plat entitled: _____ fully meet the requirements of the Jefferson County Board of Health and are hereby approved as shown.

_____ 19__

Sanitarian
Jefferson County Board of Health

Form 4

CERTIFICATE OF THE APPROVAL OF STREETS AND UTILITIES

I hereby certify: (1) that streets, utilities, and other improvements have been installed in an acceptable manner and according to city specifications in the subdivision entitled: _____ or (2) that a security bond in the amount of \$_____ has been posted with the Clerk-Treasurer to assure completion of all required improvements in case of default, or, (3) that the need for a security bond has been waived by the Plan Commission and that the subdivider has been made aware of the conditions affording this waiver.

President
Madison Plan Commission

FORM 6. RESOLUTION OF PLAN COMMISSION
APPROVING FINAL SUBDIVISION PLAT

Name of Plat _____

Name of Owner _____

PLAN COMMISSION

_____ Address _____

The following is an extract from the minutes of the meeting of the _____ Plan Commission held _____.

1. That roads, sidewalks, curbs, drainage systems, storm drains, catch basins, rights-of-way, easements, open spaces, park and recreation sites, and other improvements and installations, etc., be constructed as set forth on such approved final plat, including the construction of all off-site improvements and drainage systems.
2. That all of the aforesaid improvements and installations be constructed in accordance with local government specifications. That in addition to the improvements and installations set forth on the approved final plat, all stipulations and undertakings appearing in the minutes of the Plan Commission, together with the Agreement offering irrevocable dedication of such improvements which the owner or developer has agreed to, are incorporated in this Resolution by reference, as well as all Agreements, regulations, rules, Resolutions, and Orders of the local government.
3. That said _____ as owners of the above plat, execute and file with the Clerk a performance bond in the amount of \$_____ sufficient to cover the full cost of said improvements as estimated by the Commission or other appropriate local government officials or agencies, which performance bond shall be issued by a Bonding or Surety Company to be approved by the Governing Body and shall also be approved by such Governing Body as to form sufficiency and manner of execution. Said performance bond shall run for a term of _____ () years (not exceeding _____ () years, provided, however, that the term of such performance bond may be extended by the Plan Commission with the consent of the parties thereto as provided by law, for a period not to exceed one (1) additional year. The bond shall also provide, among other things, that in the event that any required

improvements have not been installed and deeded to the municipality free and clear of all encumbrances as provided by this Resolution, with the terms of such performance bond, the Governing Body may thereupon declare said performance bond to be in default and collect the sum remaining payable thereunder and apply said sum towards obtaining free and clear title to said improvements, including payment of all liens and encumbrances on the property and all costs and expenses, including legal fees, incurred by the local government in acquiring free and clear title, and install such improvements as are covered by such performance bond commensurate with the extent of building development that has taken place in the subdivision but not exceeding in cost, the amount of such proceeds.

4. That the final plat will not be signed by the President of the Plan Commission until the submission and approval of the required bond by the City Council of Madison.
5. That said bond will not be released or reduced until the public improvements are approved as built by the office of the Building Commission and all improvements, roads, rights-of-way, easements, open spaces, park and recreation sites, including off-site improvements and land have been deeded to and accepted by the local government, in accordance with the procedure for dedication of improvements adopted by the Plan Commission and prior to any street, or other improvement being accepted by the city as hereinafter provided, the Subdivider shall post a Maintenance Bond and/or other security naming the City as Obligee in an amount deemed adequate by the City to insure maintenance of said improvements for a period of at least thirty-six (36) months from the date of acceptance by the City.
6. This Resolution expires on _____.

STATE OF _____)

COUNTY OF _____)

I, _____, President for the Plan Commission of Madison, Indiana, hereby certify that I have compared the foregoing copy of an extract from the minutes of the _____ Plan Commission held _____ with the original now in my office, and find the same to be a true and correct transcript therefrom.

IN TESTIMONY WHEREOF, I have hereunder subscribed my name and affixed the seal of said municipality this _____ day of _____, 19 ____.

President, Plan Commission

?

_____ All dimensions to the nearest 100th of a foot and
all angles to the nearest second.

_____ Length of all arcs - radii, points of curvature
and tangent bearings.

_____ Lot lines, street lines, and street names.

_____ Building setback lines.

_____ Lots numbered.

_____ Names, locations of adjoining properties and streets.

_____ Street profiles and cross-sections.

_____ Required physical improvements have been made or bond posted in the
amount of \$_____.

_____ Certificate of approval of the Final Plat. (Form 5)

Approved for Recording _____

—

(Date)

Variances granted _____

—

—

—

Disapproved _____ for the following reasons:

(Date)

—

—

—

X

~~X~~

SUBDIVISION CHECK LIST

Prepared by the _____ Plan Commission

Note: It is recommended that the subdivider keep a running record of the status of his plat by checking the appropriate boxes below.

ACTION BY SUBDIVIDER

1. Retain a duly licensed engineer or surveyor to draw up the plat.

Name of Engineer

2. Consult with Plan Commission-Preliminary Sketch-Free hand on topographic map.

Date of Meeting

3. Secure the following official documents of local municipality:

___3.1 Zoning Ordinance

___3.2 Subdivision Regulations

___3.3 Rules Governing the Preparation of Plats

___3.4 Improvements Specifications

___3.5 Application Form for Approval of Subdivision
Plat by the Plan Commission.

4. Refer to the following official documents of the local municipality:

___4.1 Comprehensive Plan

___4.2 Official Map(s) relative to project

5. Secure the following documents relating to the site:

___5.1 Survey (including topography)

___5.2 Title Search

6. Secure preliminary review of site by Building Commissioner (suitability for residences, minimum lot sizes, water supply, drainage, sewerage).

Name of Reviewing Official
Xi

~~Name of Reviewing Official~~

~~xi~~

7. Prepare preliminary layout of proposed subdivision complying with all municipal, county, and state regulations insofar as possible, but not omitting computations except rough profiles and approximate street and lot sizes.
8. Obtain appointment through the Plan Commission Secretary for a review of preliminary layout of proposed subdivision.

Date of Meeting

Time

9. Provide the following documents for preliminary review of the Plan Commission:

___9.1 Evidence of legal ownership of property.

___9.2 Three (3) copies of preliminary layout with topographic map and rough profiles of proposed streets.

___9.3 Map showing relation to adjacent properties and to general area.

___9.4 List of exceptions to regulations, codes, ordinances, and specifications desired by subdivider.

___9.5 Deed restrictions, existing, and proposed if any.

ACTION BY PLAN COMMISSION

10. Arrange a meeting for review of preliminary layout and notify subdivider.

Date of Meeting

Time

11. Review Preliminary Plat and convey the following to the subdivider in a formal communication:

___11.1 Specific changes required.

___11.2 List of requirements which Plan Commission will waive, with detailed reasons for each item waived.

Date of Communication

~~xii~~

ACTION BY SUBDIVIDER

12. Prepare final subdivision plat in accordance with regulations as amended.
13. Submit plat to Plan Commission and City Council for final approval, accompanied by the following documents:
 - ___13.1 Formal Application
 - ___13.2 Dedication papers for all lands to be ceded by the subdivider, approved as to form by the City Attorney.
 - ___13.3 Certificate of satisfactory completion of all required improvements signed by duly designated approving official; or performance bond approved as to form, manner of execution and surety by the City Attorney; and approved as to sufficiency by Building Commissioner.
14. Tentative layout of entire tract if a portion only is submitted for present approval and filing.

Date Submitted

Signature of Receiving Official

Form 9

NOTICE TO INTERESTED PARTIES

CITY OF MADISON PLAN COMMISSION

Notice is hereby given that the City of Madison Plan Commission, on the ____ day of ____
_____, 19__, at ____ p.m. in the City Hall at 416 West Street, Madison, Indiana,
will hold a public hearing on _____ SUBDIVISION
(Name of Subdivision)

The proposed subdivision involves _____ Lots on _____ acres
located on _____ in _____ TOWNSHIP,
(Street or Road)

SECTION _____, T____N,____R____W.

(Petitioner)

FORM 10

CITY OF MADISON PLAN COMMISSION
AFFIDAVIT OF NOTICE TO INTERESTED PARTIES
FOR PRELIMINARY SUBDIVISION APPROVAL

STATE OF INDIANA)
COUNTY OF (NAME)) SS:

(Name of Subdivision)

I, _____, do hereby certify that notice to interested parties of the date, time, and place of the public hearing on the above referenced subdivision _____ being the application of _____ was certified and mailed to the last known address of each of the following persons owning property adjoining or adjacent to the property contained in this petition:

OWNER

ADDRESS

and that said notices were sent by certified mail on or before the _____ day of _____, 19__, being at least ten (10) days prior to the date of the public hearing.

(Petitioner of Agent)

Subscribed and sworn to before me, a Notary Public in and for said County and State, this _____ day of _____, 19__.

My Commission expires:

(Notary Public)

residing in _____ County

a:\cs-dev.wpd

**CITY OF MADISON
CONSTRUCTION STANDARDS FOR
DEVELOPMENT AND PUBLIC IMPROVEMENTS**

Adopted: October, 1994

These standards are to be used in conjunction with the City of Madison Subdivision Regulations dated _____.

CITY OF MADISON

CITY COUNCIL

Attest: _____
Clerk-Treasurer

ARTICLE I CONSTRUCTION STANDARDS FOR EARTHWORK

SECTION A - SITE CLEARING

PART 1 - GENERAL

- 1.01 **DESCRIPTION:** The Contractor shall clear and grub the project site as described herein. Clearing and grubbing shall consist of clearing the surface of the ground of the designated areas of all trees, stumps, down timber, logs, snags, brush, undergrowth, hedges, heavy growth of grass or weeds, fences, buildings, debris and rubbish of any nature, natural obstructions or such material which is unsuitable for the foundations, pavements, or other required structures, including the grubbing of stumps, roots, matted roots, and the disposal from the project of all spoil materials resulting from clearing and grubbing by burning or otherwise.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

- 3.01 **CLEARING AND GRUBBING:**
- A. Clearing and grubbing will be performed by the Contractor within the project construction limits. All items removed by clearing and grubbing shall be disposed of offsite except as otherwise approved by the City.
 - B. Grubbing shall be carried to a depth of 12 inches below existing ground, except in areas of 3 feet or more of fill, where stumps and other objects may extend 6 inches above existing ground. All holes remaining after grubbing operations shall be filled with suitable material and properly compacted.

SECTION B - EXCAVATING AND BACKFILL FOR STRUCTURES

PART 1 - GENERAL

- 1.01 **DESCRIPTION:** This section describes the work involved with excavating, filling and embankment for the various structures such as utility manholes, lift stations, drainage structures, etc., as shown on the plans. The work shall include all excavation and trenching; handling, storage, transportation and disposal of excavated material; all necessary sheeting, shoring and protection of work; subgrade preparations; pumping and dewatering as necessary or required; protection of adjacent property; backfilling; construction of fills and embankments; and other appurtenant work

as required for the construction.

1.02 QUALITY ASSURANCE: Testing and inspection services as required by this section shall be provided by Contractor. Tests will include hand auger probing, field density tests for verifying the degree of compaction and excavation inspections to determine the limits of unsuitable material to be removed.

1.03 REFERENCES:

A. American Society of Testing Materials (ASTM) Publications:

1. ASTM D-698 Moisture - Density Relations of Soils Using 5.5-lb. Rammer and 12-inch Drop.
2. ASTM D-1556 Density of Soil in Place by the Sand Cone Method.
3. ASTM D-2167 Density of Soil in Place by the Rubber Balloon Method.
4. ASTM D-2922 Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
5. ASTM D-3017 Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

B. Indiana Department of Transportation (INDOT) Publication: Latest edition of the Standard Specifications.

C. Occupational Safety and Health Administration (OSHA) Standards 29 CFR Part 1926 including subparts A, B, C, D and P.

PART 2 - PRODUCTS

2.01 FILL MATERIALS:

A. Granular Backfill material shall be as defined in Section 211.02 ("B" Borrow) of the Indiana Department of Highways Standard Specifications, latest edition.

B. Coarse Aggregate shall be No. 1 or No. 2 size coarse aggregate as specified by Section 903.02 of the Indiana Department of Highways Standard Specifications, latest edition.

C. General Fill: General fill material is defined as a soil material which conforms to the following:

1. Contains no more than five (5) percent organic material and is free of trash, rubble, or other man-made objects.
 2. Contains no particles larger than four (6) inches.
- D. Structural Backfill: Structural backfill material shall be:
1. Sand and gravel or crushed stone with two (2) inch maximum particle size and containing no more than eight (8) percent by weight passing a no. 200 sieve.
 2. In addition, the uniformity coefficient shall be greater than four (4).
 3. The liquid limit shall not be greater than 25 and the plasticity index not more than 6.
- E. Porous Backfill shall be gravel, or crushed stone meeting the requirements of ASTM 448, No. 4 size coarse aggregate.

PART 3 - EXECUTION

3.01 TOPSOIL: All areas requiring excavation or grading revisions shall be stripped of topsoil to a minimum depth of 6". The Contractor shall stockpile the topsoil for reuse at the site. The topsoil shall be free of trash, debris, and surface vegetation. Final placement of topsoil shall be performed in accordance with Section D of this Article.

3.02 EXCAVATION:

A. GENERAL:

1. Excavation shall be performed to the lines and grades shown on the plans. The work shall be performed in a safe and proper manner with suitable precautions being taken against all hazards. Excavations shall provide adequate working space and clearances for the work to be performed including the installation and removal of concrete forms. In no case shall excavation faces be undercut for extended footings.
2. Subgrade surfaces shall be clean and free of loose material of any kind when concrete is placed thereon.
3. All suitable excavated material meeting the requirements of General Fill shall be used as backfill, in the formation of embankments or engineered fill, or for other purposes shown on the plans. All unsuitable material shall be removed from the site unless otherwise allowed by the City. Satisfactory excavated materials shall be stockpiled until required for fill or embankment. Stockpiles shall be graded and shaped for proper drainage.

4. When the volume of the excavation exceeds that required to construct fill to the grades indicated, the excess shall be disposed of off site unless allowed by the City. When the volume of excavation is not sufficient for constructing the fill to the grades indicated the Contractor shall obtain the needed fill from off site sources.
 5. Excavation work shall be performed in accordance with all applicable provisions of the OSHA Standards for excavation safety.
- B. UNDERGROUND UTILITIES: Utilities shall be located in areas of work prior to commencement of work. If utilities are to remain in place, adequate means of support and protection during earthwork operations shall be provided. Should unknown or unidentified piping or other utilities be encountered during excavation, the Contractor shall consult applicable utilities immediately for directions. The Contractor shall cooperate with the City and the utility companies in keeping respective services and facilities in operation. The Contractor shall repair damaged utilities to the satisfaction of the utility owner.
- C. SHEETING AND SHORING: Except where banks are cut back on a stable slope, excavation for structures and trenches shall be properly and substantially sheeted, braced and shored, as necessary, to prevent caving or sliding, to provide protection for workmen and the work. Sheeting, bracing, and shoring shall be designed and built to withstand all loads that might be caused by earth movement or pressure, and shall be rigid, maintaining shape and position under all circumstances. Sheeting and shoring shall comply with all applicable requirements of the OSHA Standards for excavation.
- D. UNSUITABLE BEARING MATERIAL: Materials encountered at design elevations which are considered inadequate for suitable bearing shall be removed and replaced. Removal shall be to a depth as required to reach suitable bearing material. Fill material shall consist of either Structural Backfill or concrete.
- E. SUBGRADE STABILIZATION:
1. Subgrades for concrete structures shall be firm, dense, and thoroughly compacted and consolidated; shall be free from mud; and shall be sufficiently stable to remain firm and intact under the feet of the workmen.
 2. Subgrades for concrete structures which are otherwise solid, but which become mucky on top due to construction operations, shall be reinforced with crushed stone or gravel. The finished elevation of stabilized subgrades shall not be above subgrade elevations shown on the Plans.
- F. ROCK EXCAVATION:

1. For the purpose of excavated materials, rock is defined as boulders and solid masonry larger than 1/2 cubic yard in volume or solid ledge rock and masonry which requires removal by means of blasting, drilling, or otherwise breaking up with power operated tools. Any material which can be reasonably removed by hand tools, backhoe, or power operated excavator shall not be defined as rock.
2. Blasting:
 - a. No blasting of rock shall be performed within 40 feet of existing pipes or other structures. Blasts shall be properly covered and the pipe or structure properly protected. Warning shall be given to all people in the immediate vicinity. Blasting shall be at the risk of the Contractor who shall be liable for all damages to people or property. Necessary permits shall be secured and paid for by the contractor. The City shall be notified at least three days before blasting is to take place.
 - b. Only experienced, skillful and trustworthy workmen shall be employed in the handling and use of explosives, or have access thereto. All blasting operations shall be conducted in strict accordance with existing ordinances, regulations and specifications relative to rock blasting and the storage and use of explosives.
 - c. The contractor shall keep explosives on the site only in such quantity as may be needed for the work under way and only during such time as they are being used. Explosives shall be stored in a secure manner and separate from all tools. Caps or detonators shall be safely stored at a point over 100 feet distant from the explosives. When the need for explosives has ended, all such materials remaining on the site shall be promptly removed from the premises.
 - d. In addition to observing all municipal ordinances and state and federal laws relating to the transportation, storage, handling, and use of explosives, the contractor shall conform to any further regulations which the City may think necessary in this respect. In the event that any of the above mentioned laws, ordinances, or regulations require a licensed blaster to perform or supervise the work of blasting, said licensed blaster shall, at all times, have his license on the work and shall permit examination thereof by the City or other officials having jurisdiction.

G. DEWATERING:

1. The Contractor shall provide and maintain adequate dewatering equipment to remove and dispose of all surface and ground water entering excavations,

trenches, or other parts of the work. Each excavation shall be kept dry during subgrade preparation and continually thereafter until the structure to be built, or pipe to be installed therein is completed to the extent that no damage from hydrostatic pressure, flotation, or other cause will result.

2. All excavations which extend down to or below static ground water elevations shall be dewatered by lowering and maintaining the ground water surface beneath such excavations a distance of not less than 12 inches throughout the time the excavation remains open.
3. Surface water shall be diverted or otherwise prevented from entering excavated areas or trenches to the greatest extent practicable without causing damage to adjacent property.
4. The Contractor will be held responsible for the condition of any pipe or conduit which he may use for drainage purposes, and all such pipes or conduits shall be left clean and free of sediment.
5. Water shall be disposed of in such a manner as will not cause injury to public or private property nor be a nuisance or a menace to the public. The Contractor shall be responsible for any and all permits and approvals thereof necessary for disposal of the water.

3.03 BACKFILL AND EMBANKMENT:

A. MATERIALS:

1. To the maximum extent available excess earth obtained from structure and trench excavation shall be used for the construction of fills and embankments. Additional material shall be obtained by the Contractor from outside sources.
2. All material placed in fills and embankments shall meet the requirements of General Fill as previously defined. No rocks or stones shall be placed in the upper 18 inches of any fill or embankment. Rocks or stones within the allowable size limit may be incorporated in the remainder of fills and embankments, provided they are distributed so that they do not interfere with proper compaction, except that no rocks or stones shall be placed in fill area under structures.

B. PLACEMENT:

1. The backfill and fill materials shall be evenly placed adjacent to structures, piping or conduit to the required elevations. Care shall be taken to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying the material uniformly around the structure, piping or

conduit to approximately the same elevation in each lift.

2. Where fill is required on both sides of a foundation or wall, the fill shall be placed simultaneously on each side. Fill against building walls shall not be placed until the first floor slab has been poured and set.
3. Fill against other work shall be in a manner and at such time as not to endanger the stability or damage the work. No fill shall be placed against water bearing walls until they have been tested for watertightness. No fill shall be placed over snow or frozen material.
4. Materials such as brush, hedge, roots, stumps, grass, and other organic matter shall not be incorporated or buried in the engineered fill.

C. COMPACTION:

1. Compaction of backfill and embankment material shall be accomplished by mechanical means such as vibratory plates or rollers. Compaction by jetting methods will not be performed unless specifically allowed by the City. No backfill shall be deposited or compacted in water.
2. Backfill shall be placed in 8 inch loose layers and each layer compacted to not less than 95 percent of maximum dry density; the moisture content shall be within two percentage points of optimum as determined by ASTM D-698.
3. Granular fill under slabs shall be placed after the subgrades have been leveled and cleared of all debris and immediately prior to pouring of the slab. Granular material shall be placed in 8 inch loose layers and each layer compacted to not less than 98 percent of maximum dry density; the moisture content shall be with 2 percentage points above optimum as determined by ASTM D-698.

3.04 COMPACTION TESTING:

- A. Sampling and testing shall be the responsibility of the Contractor. Tests shall be performed by an approved commercial testing laboratory or may be tested with approved facilities furnished by the Contractor. All test results shall be submitted to the City.
- B. Laboratory tests for moisture-density relations shall be determined in accordance with ASTM D-698. A minimum of one test shall be performed on each different type of material used for backfill.
- C. Field In-Place Density Tests:

1. The Contractor shall perform a sufficient number of compaction density tests to demonstrate that the required compaction requirements are being met. In general a minimum of one (1) satisfactory compaction test shall be performed for each cumulative lift length of 400 feet. Upon failure of a test, the lift shall be recompacted and retested. Additional tests will be required if the first tests consistently fail, if material changes, or if the Contractor's method of compaction changes.
2. Density tests shall be determined in accordance with ASTM D-1556, ASTM D-2167 or ASTM D-2922. When ASTM D-2922 is used, the calibration curves shall be checked and adjusted using only the sand cone method as per ASTM D-1556. ASTM D-2922 results in a wet unit weight of soil and when using this method, ASTM D-3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gages shall be checked along with density calibration checks as described in ASTM-D3017. The calibration checks of both the density and moisture gages shall be made at the beginning of a job and on each different type of material encountered. Copies of calibration curves and results of calibration tests shall be furnished to the City.

SECTION C - TRENCHING AND BACKFILLING FOR UTILITIES

PART 1 - GENERAL

1.01 DESCRIPTION: This work includes, but is not necessarily limited to excavation and backfilling for all sewer lines, water lines, power and instrumentation cables and other utilities as shown on the drawings.

1.02 QUALITY ASSURANCE:

Testing and inspection services as required by this section shall be provided by the Contractor. Tests will include hand auger probing, field density tests for verifying the degree of compaction and excavation inspections to determine the limits of unsuitable material to be removed.

1.03 REFERENCES:

A. American Society of Testing Materials (ASTM) Publications:

1. ASTM D-698 Moisture - Density Relations of Soils Using 5.5-lb. Rammer and 12-inch Drop.
2. ASTM D-1556 Density of Soil in Place by the Sand Cone Method.

3. ASTM D-2167 Density of Soil in Place by the Rubber Balloon Method.
 4. ASTM D-2922 Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
 5. ASTM D-3017 Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- B. Indiana Department of Transportation (INDOT) Publication: Latest edition of Standard Specifications.
 - C. Occupational Safety and Health Administration (OSHA) Standards 29 CFR Part 1926 including Subparts A,B,C,D and P.

1.04 CARE OF EXISTING STRUCTURES AND PROPERTY:

- A. All poles, fences, sewer, gas, water, drainage or other pipes, wires, conduits, manholes, buildings, structures and property in the proximity of any excavation shall be supported and protected from damage by the Contractor during construction.
- B. Wherever sewer, gas, water, drainage or other pipes or conduits cross the excavation, the Contractor shall support said pipes and conduits without damage to them and without interrupting their use during the progress of the work.
- C. All property shall be thoroughly cleaned of all surplus materials, earth and rubbish placed thereon by the Contractor.
- D. Any damage to poles, fences, sewer, gas, water, drainage or other pipes, wires, conduits, manholes, buildings, structures and property resulting from the Contractor's work shall be promptly repaired by the Contractor. The quality of all such repair work shall be to the satisfaction of the City and the owner of said utility or structure.

1.05 EXISTING UNDERGROUND STRUCTURES AND UTILITIES:

- A. The Contractor shall notify the appropriate utility companies at least seventy-two (72) hours prior to the start of construction.
 1. The utility companies will locate any existing underground utilities and structures within the site limits.
 2. The Contractor, prior to the start of construction, shall verify the location of any existing underground utilities and structures within the site limits. It is the Contractor's responsibility to make any and all exploratory investigation which

may be necessary to verify or locate the utility pipes, wires, structures and appurtenances of others.

PART 2 - MATERIALS

2.01 BACKFILL MATERIALS:

- A. Granular material, where required, shall comply with Article 211.02 of the INDOT Standard Specifications. Maximum stone size shall not exceed 1 inch or the maximum size recommended by the pipe manufacturer, whichever is smaller.
- B. General backfill material shall contain no more than 5% organic material, no particles larger than four (4) inches and shall be free of trash, rubble and debris. Excavated material meeting these requirements can be used as general backfill.
- C. Crushed stone material shall be No. 53 complying with Article 904.02 of the INDOT Standard Specifications.

PART 3 - EXECUTION

3.01 GENERAL:

All work shall conform to the requirements of all local, state and federal agencies having jurisdiction and the requirements of these specifications.

3.02 GENERAL TRENCHING:

- A. Not more than 300 feet of trench shall be opened at any time with not more than 100 feet opened in advance of the completed pipe laying operation.
- B. Surface encumbrances, located so as to create a hazard to employees involved in excavation work or in the vicinity thereof at any time during operations, shall be removed or made safe before excavating is begun.
- C. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench sufficient to avoid overloading and to prevent slides and cave-ins. Adequate drainage shall be provided for the stockpiles and surrounding areas by means of ditches, dikes, or other suitable methods. The stockpiles shall also be protected from contamination with unsatisfactory excavated material or other material that may destroy the quality and fitness of the suitable stockpiled material.
- D. Grading shall be done as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating therein shall be removed so that the stability of the bottom and sides of the excavation is maintained. In wet trenches

dewatering equipment shall be operated ahead of pipe laying and the water level kept below the pipe invert.

- E. Excavation work shall be performed in accordance with all applicable provisions of the OSHA standards for trench and excavation safety and as recommended by the pipe manufacturer.
- F. Excavation for manholes or similar structures shall be sufficient to leave at least 12 inches clear between the outer structure surfaces and the face of the excavation or support members and be of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations. When concrete is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before the concrete is to be placed.
- G. Dust conditions shall be kept to a minimum by the use of water. The use of salt, or calcium chloride will not be permitted.

3.03 ROCK EXCAVATION:

- A. The Contractor shall excavate rock, if encountered, to the lines and grades indicated on the drawings, shall dispose of the excavated material, and shall furnish acceptable materials for backfill in place of the excavated rock.
- B. In general, rock in pipe trenches shall be excavated so as to be not less than 6 inches from the pipe after it has been laid. Before the pipe is laid, the trench shall be backfilled to the correct subgrade with thoroughly compacted suitable material.

3.04 REMOVAL OF EXCAVATED MATERIAL:

- A. As trenches are backfilled, the Contractor shall remove all surplus material, regrade and leave clear, free, and in good order all roadways and sidewalks affected by the construction. During the progress of and until the expiration of the guarantee period, he shall maintain in good and safe conditions the surface or any street over the trenches and promptly fill all depressions over and adjacent to trenches caused by settlement of backfilling.
- B. Surplus or unsatisfactory excavated soil materials shall be properly disposed of off site.
- C. Excavated rock shall be disposed off the site limits unless otherwise approved by the City.

3.05 PAVEMENT REMOVAL: Where necessary, the Contractor shall remove existing street pavements, driveways, curbs and sidewalks to the minimum width necessary to

accommodate the sewer construction work. Asphalt and concrete surfaces shall be cut and removed to straight lines parallel to the trench.

- 3.06 CLEARING AND REPLACING TOPSOIL: The site of all open cut excavations shall be cleared of obstructions preparatory to excavation. On all public or private property where grants of easements have been obtained, the Contractor shall remove and keep separate the topsoil, and shall carefully replace it after the backfilling is completed. In lieu of replacing the original topsoil, the Contractor may furnish and place "borrow" topsoil as specified in Section D of this Article.
- 3.07 PROTECTION AND CARE OF EXISTING FACILITIES: All poles and overhead utility wires, fences, sidewalks, curbs, signal lights, mail boxes, road or street signs, culverts, building, and other surface structures shall be protected and preserved by the Contractor and shall be repaired, replaced or otherwise restored to a condition equal to or better than they were before the work was started. All water and gas mains and services; sewers and sewer services; drains, petroleum pipes, buried electric, telephone, television, telegraph and signal cables and conduits; manholes, storm water inlets, foundations and other subsurface structures shall be properly supported and protected during construction and left in a condition equal to or better than they were before the work started. Fire hydrants shall remain accessible to fire department personnel at all times.
- 3.08 STRUCTURES ENCOUNTERED:
- A. The Contractor shall contact the Owners of the various utilities or facilities in the project area prior to the start of construction for the location of the various utilities or facilities. The Contractor shall take the necessary steps and actions to determine the exact location of underground utilities and facilities, and shall exercise sufficient care during construction to prevent damage to said utilities and facilities.
 - B. If, during the course of construction, it becomes necessary to relocate any water main, gas main, telephone cable or conduit, cable television, or electric line, it shall be the responsibility of the utility company involved to make the necessary relocation. However, the Contractor shall assume all risk and liability for any inconvenience, delay, or damage sustained by him due to any interference from the said underground utility or the operations of moving them.
 - C. Where existing sanitary and storm sewers exist which are in conflict with the construction of the proposed pipe, the Contractor shall relocate, or temporarily remove and reconnect said conflicting sewers. Contractor shall be responsible for properly handling any flow in said sanitary or storm sewers during his work. In either case, sewer shall be returned to a condition equal to or better than the condition at the start of construction.
 - D. All culverts, which are in conflict with the construction shall be relocated, or temporarily removed and relocated. Contractor shall be responsible for properly

handling any flow through said culverts during his construction.

- 3.09 COVERING ENDS: Before leaving the work for the night, during a storm, or for any other reason, care must be taken that the unfinished end of any pipe is securely closed with a tightly fitting cover or plug. Any earth or other material that may find entrance into the pipe, through any such open end of an unplugged pipe shall be removed at the Contractor's expense.
- 3.10 STABILIZATION: If portions of the bottom of trenches or excavations consist of material unstable to such a degree that, it cannot adequately support the pipe or structure, the bottom shall be overexcavated and stabilized with granular material in compliance with Articles 211.02 and 211.04 of the INDOT Standard Specifications.
- 3.11 SHEETING AND BRACING:
- A. Sheeting and bracing shall be placed in the trench, as may be necessary for the safety of the work and public, for the protection of the workmen, adjacent properties, and for the proper installation of the work in accordance with all applicable provisions of the OSHA standards.
 - B. Sheeting and/or bracing shall be progressively removed as the backfill is placed in such a manner as to prevent the caving in of the sides of the trench or excavation, and to prevent damage to the work.
 - C. Sheeting which is placed for the protection of the public, adjacent properties, or structures shall not be removed until the backfill has been placed and thoroughly compacted. While being removed, all vacancies left by this sheeting shall be carefully filled with sand free from silt, rammed into place, puddled or otherwise firmly compacted.
- 3.12 PIPE BEDDING:
- A. Each pipe section shall be laid on a firm foundation of bedding material, haunched, and backfilled as detailed herein.
 - B. Rigid pipe materials such as concrete or ductile iron shall be bedded with well graded gravel conforming to the requirements of ASTM C33, Gradation 67. Materials meeting this requirements include No. 8 coarse aggregate as specified by Section 904.02 of the INDOT Standards.
 - C. Flexible pipe materials including Poly Vinyl Chloride (PVC) shall be installed and bedded in accordance with the latest revision of ASTM D2321 using a Class 1B embedment material.
 - D. The bedding material shall be spread the full width of the trench bottom. The bedding material shall be so placed as to fill the space under the lower part of the

pipe to provide full length pipe support.

3.13 BACKFILLING:

- A. Trenches shall be backfilled to existing grade or grades as shown on the plans. The trenches shall be backfilled to at least 2 feet above the top of pipe prior to performing required pressure tests for water lines. Joints and couplings shall be left uncovered during pressure tests. Remaining backfill shall not be placed until all specified pressure tests are performed.
- B. Backfilling of utility lines not located within roadway limits, sidewalk areas, and driveways shall consist of tamping 6 inch layers of general backfill (as defined herein) until the pipe has a minimum of 12 inches of cover. The remainder of the backfill may be carefully placed in the trench and mounded above finish grade to allow for settlement until final grading and restoration is accomplished. The top 4 inches shall contain no stones or objects larger than 1 inch maximum dimension. The Contractor shall be responsible for maintaining the trench to final grade until settlement has ceased or for a maximum of one year.
- C. All backfill under or within 2 feet of any roadway, driveway shoulder or sidewalk shall be granular backfill as described herein.

The method of backfilling under a roadway shall consist of placing granular backfill in maximum 8" layers, loose measurement, and then each layer shall be mechanically compacted to the required density. The method of granular backfill installation shall be as defined in Section 211.03, 211.04 and 211.05 of the Indiana Department of Transportation Standard Specifications, latest edition. All backfill shall be compacted to 95% of maximum density. Where excavation occurs within the right-of-way of a state highway, all areas within 12 feet of the edge of pavement shall be backfilled with granular backfill.

3.14 COMPACTION TESTING:

- A. Sampling and testing shall be the responsibility of the Contractor. Tests shall be performed by an approved commercial testing laboratory or may be tested with approved facilities furnished by the Contractor.
- B. Laboratory tests for moisture-density relations shall be determined in accordance with ASTM D-698. A minimum of one test shall be performed on each different type of material used for backfill.
- C. Field In-Place Density Tests:
 - 1. Shall be performed in sufficient numbers to ensure that the specified compaction is being obtained. A minimum of one test per lift of backfill for

every 500 feet of installation shall be performed.

2. Shall be determined in accordance with ASTM D-1556, ASTM D-2167 or ASTM D-2922. When ASTM D-2922 is used, the calibration curves shall be checked and adjusted using only the sand cone method as per ASTM D-1556. ASTM D-2922 results in a wet unit weight of soil and when using this method, ASTM D-3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks as described in ASTM-D3017. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job and on each different type of material encountered.

D. All test results shall be submitted to the City.

E. Trenches improperly compacted shall be reopened and then refilled and compacted to the density specified. Field in-place density tests shall also be repeated for improperly compacted trenches that are reopened, refilled and recompactd.

SECTION D - TOPSOIL

PART 1 - GENERAL

- 1.01 DESCRIPTION: The work of this section consists of surface preparation and placement of topsoil on all areas to receive seeding and/or planting.

PART 2 - PRODUCTS

- 2.01 MATERIAL SOURCE: Topsoil material shall be supplied from on site stockpiles as specified in Sections B and C and/or off site sources and shall meet the requirements specified below.
- 2.02 TOPSOIL:
1. Topsoil shall consist of natural, fertile, agricultural soil capable of sustaining plant and lawn growth. The material shall be free of stones 2" or larger, stumps, clay lumps, roots, brush or other objectionable materials.
 2. The topsoil or soil mixture shall have a pH range of 5.6 to 7.6, or adjusted to this range by addition of agricultural limestone.

PART 3 - EXECUTION

- 3.01 PREPARATION: Immediately prior to dumping and spreading topsoil on any area, the surface shall be loosened or disced to a minimum depth of 2" to facilitate bonding of the

topsoil to the covered subgrade soil.

- 3.02 **INSTALLATION:** After surface preparation, topsoil shall be evenly spread to a minimum finished depth of 6" for seeded areas and 8" for planting areas. The topsoil surface shall conform to the required lines and grades as shown on the plans.

SECTION E - MULCHED SEEDING

PART 1 - GENERAL

- 1.01 **DESCRIPTION:** The work of this section consists of mulched seeding and includes furnishing and placing seed, fertilizer, agricultural limestone, and mulch in a prepared seed bed as specified herein. Seeding shall be required in all areas disturbed by construction unless otherwise designated for alternative surfacing.

PART 2 - PRODUCTS

- 2.01 **GENERAL:** All materials as noted shall be in accordance with Section 621 of the Indiana Department of Transportation (IDOT) Standard Specifications, latest edition.
- 2.02 **SEED:** In all residential areas or privately maintained areas, the seed mixture shall be Type "U" as per Section 621.05. Where seeding is required on slopes 3:1 or steeper, Type "CV" seed mixture shall be used. In all other areas where seeding is required, the mixture shall be Type "R" as per section 621.05.
- 2.03 **FERTILIZER:** Fertilizer shall be standard commercial fertilizer with an analysis of 12-12-12.
- 2.04 **AGRICULTURAL LIMESTONE:** Agricultural limestone shall be in accordance with Section 914.02 of the IDOT Standard Specifications.
- 2.05 **MULCH:** Mulch shall comply with Section 914.05(a) of the IDOT Standard Specifications except that wood cellulose fiber mulch will not be allowed.

PART 3 - EXECUTION

- 3.01 **INSTALLATION**
- A. The work shall be performed in accordance with all applicable provisions of Section 621.03 and 621.04 of the IDOT Standard Specifications.
- B. Mulch seeding shall be performed only between February 1 and October 16 unless otherwise approved by the City.

- C. All water used shall be obtained from fresh water sources, preferably potable water, and free of harmful chemicals.

ARTICLE II - SANITARY SEWER SYSTEMS

SECTION A - GRAVITY SANITARY SEWERS

PART 1 - GENERAL

1.01 DESCRIPTION:

Work under this section includes the installation and testing of gravity sanitary sewer pipe, fittings, and connections.

1.02 QUALITY ASSURANCE:

- A. All similar components shall be manufactured and furnished by one manufacturer.
- B. Only one type of pipe may be used for the project unless otherwise approved by the City. The Contractor shall select one type of pipe from those listed in this specification.

PART 2 - PRODUCTS

2.01 POLYVINYL CHLORIDE PIPE

- A. PVC Pipe 4" through 15" in diameter.
 - 1. All PVC Pipe 4" through 15" in diameter shall conform to ASTM D1784, "Rigid Poly (Vinyl Chloride) and Chlorinated Poly (Vinyl Chloride) Compounds" and either:
 - a. ASTM F794, "Poly (Vinyl Chloride) (PVC) Ribbed Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter",
 - b. ASTM F949, "Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings", or
 - c. ASTM D3034, "Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings".
 - d. ASTM F-789 Type PS-46 Poly (Vinyl Chloride) (PVC) Plastic Gravity Flow Sewer Pipe and Fittings.
 - 2. PVC sewer pipe shall be SDR 35 with cell classification of 12454-B or 12454-C.

- ## 2.02 DUCTILE IRON PIPE:

- II - 2

- D. Pipe fittings shall be short body pattern designed in accordance with ANSI/AWWA C110/A21.10. Fittings for pipe up to 12 inches in diameter shall be pressure Class 250 and pipes 14 inches and larger shall be pressure Class 150.
- E. Blind flanges, companion flanges and flange fillers shall conform to ANSI B16.1, Class 125.

3.01 GENERAL CONSTRUCTION REQUIREMENTS:

- A. Before installing piping, the Contractor shall carefully verify location, depth, type of joint needed and size of pipe to which connection is proposed. Contractor shall assure that the lines can be run as contemplated without interfering with footings, walls, other piping, fixtures, etc.
- B. All lengths of pipe shall be dimensioned accurately to measurements established at the site and shall be worked into place without springing or forcing. Cut sections of pipe shall be reamed to remove all burrs.

- C. Utmost care shall be exercised in transporting and handling all pipe, fittings, valves, etc., in order to avoid shock and damage to pipe and coatings. Lifting shall be by hoist or skids when hand lifting is not feasible. Droppings will not be permitted. Pipe handled on skidways must not be skidded or rolled against pipe already on the ground. Damaged or defective pipe and appurtenances shall be replaced.
- D. The pipe shall be thoroughly cleaned before being laid and kept clean during construction.
- E. The Contractor shall cut all pipe and drill all holes that may be necessary.

3.02 PIPE LAYING:

- A. The laying of pipe on the prepared bedding material shall commence from the lowest point, with the spigot ends pointing in the direction of flow. All pipes shall be laid true to line and grade. They shall be carefully centered so that when laid, they form a sewer with uniform invert.
- B. A pipe plug or bulkhead shall be used whenever pipe laying operations are not in progress as required to protect the pipe ends from foreign material.
- C. Before making pipe joints, all surfaces of the joints shall be clean and dry. Lubricants, primers and adhesives shall be used in accordance with the manufacturer's recommendations. The pipe shall then be placed, fitted and adjoined so as to obtain a watertight joint. In the event that previously laid pipe is disturbed, it shall be removed and relaid.
- D. The Contractor shall assure proper alignment and grade by the proper use of lasers, batter boards, surveying instruments or other suitable means.

3.03 LEAKAGE TESTS:

- A. Prior to acceptance, all gravity sewers and manholes, including service laterals, shall be tested and pass a test for leakage. The Contractor shall furnish all labor, materials, and equipment required for making the tests and groundwater level determinations. Testing shall not be performed until backfilling and compaction are completed.

All gravity sewers shall pass one of the three following leakage tests as further specified by this section:

1. Low Pressure Air Test conforming to the requirements of the latest revision of ASTM C828 and ASTM C924 as minimum. The Low Pressure Air Test shall be used unless an Infiltration or Exfiltration Test is approved by the Engineer.

2. Infiltration Test with a maximum inward leakage of 100 gallons per inch of pipe diameter per mile per day.
3. Exfiltration Test with a maximum outward leakage of 100 gallons per inch of pipe diameter per mile per day.

In addition, the Contractor shall be required to measure the groundwater table where required and to perform a manhole leakage test (either exfiltration or infiltration).

The Contractor shall notify the City at least 48 hours in advance of any leakage tests as required to permit the City to witness such testing. Documentation of leakage tests and their results shall be kept by the Contractor with two (2) copies submitted to the City upon completion and passage.

B. Determination of Groundwater Level:

Prior to and during all testing, the Contractor shall determine groundwater levels by backfill groundwater gauges or by manhole groundwater gauges. In general a sufficient number of groundwater gauges shall be installed to determine groundwater levels in the area of the sewers being tested.

In the case of newly installed groundwater gauges or the attachment of the temporary clear plastic tubing in the manhole groundwater gauge, the level of groundwater shall be allowed to stabilize before determining the groundwater level.

C. Pipeline Testing:

1. Low Pressure Air Test:

Immediately prior to testing, the pipe shall be cleaned. After cleaning, all pipe outlets shall be plugged. The Contractor must be aware that low-pressure air testing may be dangerous. The Contractor shall review the paragraphs entitled "Safety Precautions" in ASTM C828 and ASTM C924 before beginning pressurization of the pipe. The sewer line shall then be slowly pressurized to an internal pressure of 4.0 psig greater than the hydrostatic pressure head created by any groundwater over the pipe (i.e., the height of groundwater above the invert of the pipe, in feet, multiplied by 0.43). Where such internal pressure adjustment would result in a starting pressure greater than 9.0 psig, an Infiltration Test shall be performed. The method of pressurizing shall be such that the pressure shall be maintained until the temperature of the pipe and the air have equalized but in no case less than five minutes. After the temperature has stabilized, the air supply shall be discontinued and the pressure allowed to drop. When the pressure reaches 3.5 psig (not including additional air pressure required by groundwater), a stopwatch shall be used to record the time it takes for the pressure to drop to

2.5 psig (or a 1 pound pressure drop). If the recorded time is more than the minimum test time as computed using Table 1 below, the section of pipe shall be considered to have passed the leakage test. If the recorded time is less than the minimum test time, the line shall be considered to have failed the test, shall be inspected for possible leaks and retested upon correction until such time as the line passes the requirements.

TABLE 1

LOW PRESSURE AIR TEST
MINIMUM TEST TIME FOR PRESSURE TO DROP FROM
3.5 TO 2.5 PSIG

<u>Nominal Pipe Diameter, Inches</u>	<u>Minimum Test Time, Minutes per 100 Feet</u>
4	0.3
6	0.7
8	1.2
10	1.5
12	1.8
15	2.1
18	2.4
21	3.0
24	3.6
27	4.2
30	4.8
33	5.4
36	6.0
39	6.6
42	7.3

2. Infiltration Test:

An infiltration test shall be used only when approved by the City or when the starting pressure for the Low Pressure Air Test would be greater than 9.0 psig. For an infiltration test to be performed, the ground water elevation must be at least 2.0 feet above the crown of the upstream pipe. The test shall require cleaning of the line and then plugging the upstream pipe opening with a watertight plug with length equal to or greater than the pipe diameter.

A 90° V-Notch weir shall be placed in the downstairs manhole of the section of pipe being tested. When performing an infiltration test with a weir, sufficient time shall be allowed for the infiltration to crest the weir and stabilize. This time shall be determined based on the allowable infiltration, the size of the sewer line, the slope of the line, and other pertinent information. In no case shall the time be less than one hour. The Contractor shall measure the head (H) of water flowing over the weir. The measurement must be accurate and taken a minimum distance of 18" or four times the height of H upstream of the weir, whichever is greater. The measured infiltration over the weir can be calculated as:

$$Q = 3240 H^{2.5}$$

where H is in inches and Q is in gallons per day.

Where the infiltration allowances are very small, and measurement by weir inaccurate, the leakage measurement shall be made by timing the filling of a container of known volume. The volume collected shall be converted to a 24-hour basis for comparison with specification requirements. If the measured infiltration is less than that allowed by Table 2 below the pipe section shall be considered to have passed the leakage test.

TABLE 2

INFILTRATION AND EXFILTRATION TESTS
ALLOWABLE INFILTRATION OR EXFILTRATION BASED ON
100 GALLONS PER DAY PER INCH OF PIPE DIAMETER PER MILE OF PIPE

<u>SEWER PIPE REQUIREMENTS</u>	
<u>Nominal Pipe Diameter, Inches</u>	<u>Allowable Infiltration/Exfiltration, Gallons Per Foot of Pipe Per Hour</u>
4	0.0032
6	0.0047
8	0.0063
10	0.0079
12	0.0095
15	0.0118
18	0.0142
21	0.0166
24	0.0189
27	0.0213
30	0.0237
36	0.0284
42	0.0331
48	0.0379

MANHOLE REQUIREMENTS

<u>Nominal Manhole Diameter, Inches</u>	<u>Allowable Infiltration/Exfiltration, Gallons Per Vertical Foot Per Hour</u>
48"	0.0379
60"	0.0473
72"	0.0568

3. Exfiltration Test:

An exfiltration test may only be performed in lieu of a low pressure air test only as approved by the City.

Before beginning the exfiltration test, the pipe shall be cleaned. Once cleared, the downstream pipe out let shall be sealed at the manhole with watertight plug. To assure a proper seal, the plug shall be at least equal to the diameter of the pipe being tested. (Note that if service laterals were connected, any opening lower in elevation than the static water level will also have to be plugged).

The upstream manhole shall then be filled with water to a static level not lower than four (4) feet above the top of the sewer pipe (at its highest point) and not less than four (4) feet higher than the existing ground water table, whichever is greater. In lieu of using the upstream manhole, a standpipe can be used to develop the specified pressure head.

The water shall be allowed to stand for a period long enough to allow water absorption into the pipe (a minimum of 6 hours). After the absorption period, the pipe shall be refilled to the established level and the test begun. After a one hour period, the exfiltrated volume shall be calculated by either measuring the drop in water level in the manhole or measuring the volume of water required to refill the standpipe to the original level, whichever applies. The measured exfiltration rate shall then be calculated and compared with the allowable exfiltration. If the measured exfiltration is less than that allowed by Table 2, the pipe tests, failure to meet the required limits will require correction, repair and retesting of the line.

3.03 DEFLECTION TESTING:

- A. Deflection testing shall be performed by the Contractor in the presence of the City or its representative on all plastic pipes with nominal inside diameters of 6-inches or greater. Deflection testing shall be accomplished using one of the following devices: calibrated television or photography, or a properly sized "go, no go" mandrel or sewer ball. Deflections of no more than 5% based on the base inside diameters shown below will be allowed:

Table 1: Allowable Deflection

<u>Nominal Size, in.</u>	<u>Base Inside Diameter, in.</u>	<u>5% Deflection Mandrel, in.</u>
6	5.742*	5.45
8	7.665*	7.28
10	9.563*	9.08
12	11.361*	10.79
15	13.898*	13.20
18	16.976**	16.13
21	20.004**	19.00
24	33.480**	21.36
27	25.327**	24.06

* From Table 69 of the Handbook of PVC Pipe, the Uni-Bell PVC Pipe Association, 1982 and/or Table X1.1 of ASTM Specification D3034.

** From Table 70 of the Handbook of PVC Pipe, the Uni-Bell PVC Pipe Association, 1982.

- B. The deflection test shall be performed no sooner than 30 days following installation of the pipe (including backfill). Prior to testing, the pipeline shall be thoroughly cleaned.
- C. Prior to acceptance, pipes having deflections greater than 5% shall be excavated, rebedded and/or replaced and retested (successfully).
- D. The Contractor shall submit deflection test reports to the City within 30 days after performance of each said test. A separate report shall be submitted for each manhole to manhole sewer section. This report shall provide all pertinent data regarding the test including, but not limited to, the date of the test, details of the testing device used, diameter of the pipe, the date installation of the line was completed including backfill, and whether the line passed or failed the test.

SECTION B - SANITARY SEWER FORCE MAINS

PART 1 - GENERAL

- 1.01 **DESCRIPTION:** The work of this section includes the supply of all materials, labor, and equipment required for the installation and testing of sanitary sewer force mains. Force main piping inside of structures such as lift stations and valve pits is specified under Section D of this Article.

1.02 QUALITY ASSURANCE:

- A. All materials shall be new and unused, supplied by a single manufacturer where possible.
- B. All pipe and fittings shall be of similar materials as allowed by these specifications.

PART 2 - PRODUCTS

2.02 POLYVINYL CHLORIDE (PVC) PIPE:

- A. Pipe - All PVC pressure pipe shall meet the requirements of either AWWA C900, DR14 (Class 200) or ASTM D2241, SDR-21 (200 PSI). PVC pipe shall have a cell classification of 12454B or 12454C. All PVC pressure pipe and fittings shall be marked indicating appropriate ASTM or AWWA designation and pressure class.
- B. Pipe Joints - All PVC pipe joints shall be bell and spigot type with elastomeric gaskets conforming to the requirements of ASTM D3137.

2.03 DUCTILE IRON PIPE:

- A. Pipe - All ductile iron pipe shall be manufactured in accordance with ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.51. Pipe shall be Pressure Class 350 for pipes 12" and smaller and Pressure Class 250 for pipes 14" and larger. All ductile iron pipe and fittings shall be cement mortar lined and seal coated in accordance with ANSI/AWWA C104/A21.4.
- B. Fittings - All ductile iron pipe fittings shall be manufactured in accordance with ANSI/AWWA C110/A21.10 having a minimum pressure rating of 250 psi.
- C. Pipe Joints - Pipe joints shall be either push-on or mechanical joint as shown on the Drawings, manufactured in accordance with the following standards:

Push-on Joints	ANSI/AWWA C110/A21.10 and ANSI/AWWA C111/A21.11
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Mechanical Joints	ANSI/AWWA C110/A21.10 and ANSI/AWWA C111/A21.11
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Bolts and Nuts	ANSI/AWWA C111/A21.11; tee-head bolts and hexagonal nuts.
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Gaskets	ANSI/AWWA C111/A21.11
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- D. Encasement - All ductile iron pipe and fittings shall be polyethylene encased in

accordance with ANSI/AWWA C105/A21.5

PART 3 - EXECUTION

3.01 HANDLING:

- A. Pipe and accessories shall be handled with care to avoid damage. Material shall not be dropped or bumped against pipe or accessories already on the ground or against any other object. Damaged pipe which cannot be repaired to the City's satisfaction shall be replaced at the Contractor's expense.
- B. The interior of all pipe and accessories shall be kept free from dirt and other foreign matter.

3.02 DIMENSIONS:

The pipe shall be furnished in the longest manufactured lengths unless otherwise shown or specified. Shorter or cut lengths shall be used only where necessary to make closure. Branches, bends or other specials, where so shown or required, shall be made to standard dimensions unless otherwise shown. All pipes shall be straight, true in form, or full diameter throughout, and shall have deep and wide socket joints.

3.03 PIPE LAYING:

- A. Deflection from a straight line or grade, as required by horizontal or vertical alignments or offsets shall be in accordance with the manufacturer's specifications.
- B. If the alignment requires deflections in excess of the allowable deflection per joint, special bends or a sufficient number of shorter lengths of pipe shall be furnished to provide angular deflections within the limit set forth.
- C. All pipe shall be laid and maintained to the required lines and grades as indicated on the plans. Fittings shall be installed at the locations shown on the plans.
- D. At times when work is not in progress, open ends of pipe and fittings shall be securely closed so that no trench water, earth, or other substance will enter the pipe or fittings.
- E. No pipe shall be laid in water or when the trench or weather conditions are unsuitable for proper installation.

- F. When the proposed elevation of the force main conflicts with the elevation of an existing gravity sewer, water main, gas main, or other structure, the force main shall be deepened as directed by the City to avoid said conflict. This shall be done at no additional expense to the City or the utility owner.
- G. Pipe shall be laid with bell ends facing in the direction of laying. Pipe ends shall be clear of dirt and debris before the connection is made.
- H. The cutting of pipe for installing valves or fittings shall be done in a neat, workmanlike manner without damage to the pipe or lining. Flame cutting of pipe shall not be allowed.

3.04 THRUST RESTRAINT:

- A. Thrust blocking or restraints shall be provided at all line deflection greater than 22° and as otherwise required to protect the pipe joints from separation.
- B. Thrust blocks shall be sized and dimensioned as shown in these standards.

3.05 HYDROSTATIC TESTING:

The testing method described in this paragraph is for water pressure testing. The test, which must be successfully performed on all new force mains, shall be performed in accordance with the following provisions:

- A. Said test shall include all force main from the point of beginning or the wastewater lift station to the point of termination. The Contractor shall make arrangements with the City for scheduling the test after the piping has been accepted as being ready for testing. Any concrete thrust blocks shall have been in place for a period of at least ten (10) days prior to test. The test shall be performed on a day mutually agreed upon and in the presence of the City.
- B. Water for testing must be furnished by the Contractor. The Contractor shall furnish all necessary equipment, piping, pumps, fittings, gauges, and operating personnel to properly conduct the test.
- C. The system shall be subjected to a hydrostatic test pressure at 100 psi.
- D. The test procedure shall be as follows:
 - 1. The system shall be slowly filled with water. Air shall be expelled from the pipe through air relief valves. If additional air vents are needed to assure that all air is expelled, the Contractor shall temporarily install corporation cocks at the appropriate points. All air shall be expelled from the force main prior to applying the test pressure.

2. After the test pressure is first applied, a visual inspection of the force main shall be made for leaks. All visible leaks shall be stopped by repairing or replacing defective or damaged pipe, fittings, or valves prior to starting the official pressure test.
3. After all visible leaks are stopped, the official test shall be conducted for a period of at least two hours. During the test, the specified test pressure shall not vary more than 5 psi.
4. Pumps shall be equipped with a receiving water receptacle, and the water entering the pipeline to make up leakage shall be carefully measured and recorded. Pumping equipment shall include suitably calibrated pressure gauges. Leakage is defined as the volume of water which must be added to the pipeline to maintain a pressure within 5 psi of the specified test pressure.

If the amount of makeup water entering the pipeline (during the 2 hour test while the pressure is maintained within 5 psi of the specified test pressure) is less than or equal to the allowable leakage as calculated by the following formula*, the pipeline shall be accepted as having passed the leakage test satisfactorily:

$$L = \frac{SD (P)^{1/2}}{133,200}$$

* Formula from AWWA Standard C600

where

L = allowable leakage, gallons per hour

S = length of pipeline tested, feet

D = nominal diameter of pipe, inches

P = average test pressure during test, pounds per square inch gauge

All visible leaks, however, shall be stopped by appropriate repairs or replacement of defective or damaged materials regardless of the outcome of the test.

- E. Should the line fail this official test, the pressure shall be maintained while a thorough search is made of all possible locations of leakage or other cause of pressure drop. When all such conditions are corrected, the pipe line shall be given another official test and this procedure repeated until satisfactory results are obtained.

- F. All leaks developing after the line has been tested and made evident by a showing of water on the ground surface shall be repaired to the satisfaction of the Engineer regardless of the results of the official test.

3.06 IDENTIFICATION/LOCATION TAPE:

- A. Furnish and install identification/location tape over the centerline of buried force mains.

- B. Identification Tape for Ductile Iron Pipe

Identification tape shall be manufactured of inert polyethylene so as to be highly resistant to alkalis, acids and other destructive agents found in soil, and shall have a minimum thickness of 4-mils. Tape width shall be a minimum of 3" and a maximum of 6" and shall have background color specified below, imprinted with black letters. Imprint shall be as specified below and shall repeat itself a minimum of once every 2' for entire length of tape.

- C. Identification Tape for Polyvinyl Chloride Pipe

Identification tape shall be manufactured of polyethylene with a minimum thickness of 4-mils and shall have a 1-mil thick metallic foil core. The tape shall be highly resistant to alkalis, acid and other destructive agents found in soil. Tape width shall be a minimum of 3" and a maximum of 6" and shall have background color specified below, imprinted with black letters. Imprints shall be as specified below and shall repeat itself a minimum of once every 2' for entire length of tape.

- D. Tape background colors and imprints shall be as follows:

<u>Imprint</u>	<u>Background Color</u>
"Caution - Force Main Buried Below"	Green

- E. Identification tape shall be "Terra Tape" as manufactured by Reef Industries, Inc., Houston, TX, or approved equal.

1. Identification tape shall be installed over all buried force mains in accordance with the manufacturer's installation instructions and as specified herein.
2. Identification tape shall be installed 2' below final grade over centerline of pipe.
3. In all PVC pipe installation, the identification/location tape shall be looped into the manholes for connection to a locating device. The tape shall be one continuous piece from manhole to manhole.

SECTION C - PRECAST CONCRETE STRUCTURES

PART 1 - GENERAL

- 1.01 **DESCRIPTION:** The work of this section includes the manufacturing and installation of precast concrete structures including manholes, lift station structures, valve vaults, utility vaults and other miscellaneous structures as detailed and specified herein.
- 1.02 **DELIVERY, STORAGE AND HANDLING:** Precast concrete structures shall be delivered to the site complete and in structurally sound condition. The Contractor shall take proper care in moving the structures to prevent cracking, breaking, or otherwise damaging the structures.

PART 2 - PRODUCTS

- 2.01 **GENERAL:** All precast structures to be used in the project shall be structurally sound and free of defects. Any spalled concrete or voids shall be properly patched or repaired using equivalent strength grout and properly cured before placement. Structures showing excessive cracking or damage should be rejected and replaced at the discretion of the City.
- 2.02 **CONCRETE STRENGTH:** All concrete used in the manufacturing of precast structures shall have a minimum compressive strength of 4,000 psi at 28 days.
- 2.03 **SEWER MANHOLES:**
 - A. All manholes for sanitary or storm sewers, shall be made watertight of size and dimensions as shown on the plans.
 - B. The base, riser sections, eccentric cone, and adjustment rings shall conform to ASTM C478. The joints between the base, riser sections and the bottom joint of the eccentric cone shall be tongue and groove type with a continuous rubber ring gasket conforming to ASTM C443 or a preformed flexible plastic gasket type joint sealant such as RUB'R-NEK as manufactured by K. T. Synder Company or equal. In addition to the gasket, the joint shall be sealed with an approved mastic.
 - C. The top of the eccentric cone shall be joined to the adjustment rings (if necessary) using a preformed flexible plastic gasket type joint sealant to obtain a watertight fit.
 - D. The manhole frame and cover shall be sealed to the adjustment rings or cone section using a preformed flexible plastic gasket type joint sealant.

- E. A watertight, flexible connection shall be made between the manhole and the sewer pipes using elastomeric gaskets conforming to ASTM C923. Gaskets shall be Kor-N-Seal as manufactured by National Pollution Control Systems, Inc. of Miford, New Hampshire, or equal and be installed in strict conformance with the manufacturers instructions.

2.04 LIFT STATION STRUCTURES AND VALVE VAULTS:

- A. Lift station structures and valve vaults shall be made watertight of size and dimensions shown on the plans.
- B. Precast structures shall meet all requirements of paragraph 2.03 above except that flat top slabs shall be used in place of eccentric cones.
- C. Where required by the plans, access hatch frames as specified herein shall be integrally cast into the top slab.
- D. All concrete surfaces subject to sewer gases shall be protected by application of coal tar epoxy suitable for the intended use. These surfaces include all areas in lift station wet wells above the specified low water level. Epoxy shall be 46H-413 Tneme-Tar as manufactured by Tnemec, or equal. Apply one coat at dry mil thickness of 16-20 mils unless otherwise recommended by the manufacturer.

2.05 UTILITY VAULTS:

- A. Utility vaults for underground electrical conduit runs shall consist of two piece square or rectangular precast sections meeting the requirements of ASTM C857.
- B. The vaults shall be made watertight by including a continuous rubber gasket conforming to ASTM C443 along the section joint.
- C. Conduit knockouts shall be located as required for the actual installation. Only those knockouts specifically used shall be removed.

2.06 FRAMES AND COVERS:

- A. Frames and covers shall be included for all manholes, utility vaults and where otherwise shown on the plans.
- B. Ferrous castings shall be as manufactured by Neenah Foundry Company, East Jordan Foundry, or equal, and shall conform to ASTM A48 Class 30. The covers and frames shall be of a design, type, and weight specified on the Plans.

- C. Castings shall be of uniform quality, free from blowholes, porosity, hard spots, shrinkage defects, cracks or other injurious defects. They shall be smooth and well cleaned by shot blasting or other approved methods. Unless otherwise specified, they shall be coated with high grade bituminous asphalt paint conforming to Federal Specifications MIL-C-450B.

2.07 MANHOLE STEPS:

- A. Steps shall be supplied for all manholes, valve vaults and utility vaults and where specifically detailed on the plans. Steps shall be cast in the precast sections.
- B. Steps shall be made of copolymer polypropylene plastic and reinforced with 1/2" Grade 60 steel. Steps shall be able to resist a 1500 pound pullout force.
- C. Steps must comply with all applicable provisions of OSHA regulations.
- D. Manhole steps shall be Model PSI-PF as manufactured by M.A. Industries, Inc. of Peachtree, Georgia or equal.

2.08 ACCESS HATCH:

- A. Where shown and required by the plans, access hatches shall be provided for precast structures. Hatches shall be either single or double door with a frame assembly fabricated of aluminum and capable of withstanding a live load of 300 lbs/sq. ft. The doors shall be equipped with heavy forged brass hinges, stainless steel pins, spring operators and an automatic hold open bar with release handle which holds the door open at 90 degrees. Each door shall be provided with a lifting handle.
- B. The access frames shall be sized as shown on the drawings. Where noted, sizing may be contingent upon recommendations by equipment suppliers as required to provide equipment removal.
- C. Access frames shall be accurately placed as an integral part of the precast top slab section.
- D. Access frames shall be protected from direct contact with the concrete by means of a protective coating.
- E. Access frames shall be type "J" or "JD" as manufactured by the Bilco Company, New Haven Connecticut, or equal.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Precast concrete structures shall be located as shown on the drawings.
- B. Excavation and backfill for precast structures shall be in accordance with Article I - Section B of these standards.
- C. Unless otherwise shown, the top of manholes and other structures shall be set at ground level or top of pavement.

SECTION C - LIFT STATION EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. Furnish and install all equipment for the lift station(s) including all structures, pumps, piping and controls as shown on the drawings and as described herein.
- B. The contractor shall be required to supply the pumps and control panel from a single manufacturer.

1.02 PERFORMANCE REQUIREMENTS:

- A. Lift station pumps shall be capable of passing a 3-inch solid sphere.
- B. Pumps shall meet the design conditions and motor conditions specified on the plans.

1.03 SUBMITTALS:

- A. The Contractor shall be required to submit two (2) copies each of the manufacturer's operation and maintenance manuals and dimensional and technical shop drawing data to the City for all equipment supplied under this section.

PART 2 - PRODUCTS

- 2.01 ACCEPTABLE MANUFACTURERS: Pumps shall be as manufactured by Flygt Corporation of Norwalk, Connecticut; Hydromatic Pumps, Inc. of Ashland, Ohio; Barnes Pumps, Inc of Piqua, Ohio, or Equal.

2.02 MATERIALS:

A. Submersible Non Clog Pumps

1. Each pump shall be of the sealed submersible non clog type capable of handling raw sanitary sewage. Pump casings, volute discharge pipe and flange, and sliding bracket shall be of gray iron. The impeller shall be gray iron of the non clog design.
2. Shaft seals shall be of suitable material capable of operating to a submerged pressure of 20 psi. The seal system shall not rely upon the pumped media for lubrication but shall instead have its own lubrication liquid chamber. No seal damage shall result from operating the pump out of its liquid environment. The seal system shall include a seal probe to detect the presence of water leakage. The probe signal shall be transmitted via the control cable to the alarm circuitry in the control panel.
3. The motor casing shall be watertight, filled with air or dielectric oil. All motors shall be supplied with heat sensing elements attached to the windings. The element shall trip the motor starter upon overheating. The element temperature setting shall be low enough to prevent damage to the pump but high enough to prevent unnecessary tripping. The sensor shall automatically reset when motor cools to a safe temperature. The pump power cable shall enter the motor through a cord cap assembly, double sealed to protect the motor from moisture.
4. A pump mounting base shall be provided and installed for each unit. The base shall include guiderails with supports as required, a base elbow and quick disconnect flanges for easy removal and proper pump alignment. Guiderails shall be made of stainless steel, sized to meet the pump loads. Each pump unit shall be supplied with a stainless steel lifting chain with hook which shall be fastened to the access hatch assembly.

B. Lift Station Control Panel

1. General
 - a. The pump manufacturer shall furnish an automatic pump station controller for operation on either a 120/240 volt single phase or a 460 volt, 3 phase-3 wire, 60 hertz power source.
 - b. The pump station controller shall be suitable for operation and automatic alternation of a duplex pump system and shall be complete with motor control, solid state alternator, convenience power supply, miscellaneous controls, etc. All components shall be UL listed.

- c. Controls for each of the two (2) pumps shall be rated for the actual horsepower from the manufacturer's information.
 - d. The control and power wiring for the pumps and level sensors shall be arranged to extend through two separate conduits to the wetwell. Conduits shall be properly sealed to protect the panel against explosive type gases which may exist in the wetwell.
2. Panel Enclosure
- a. The enclosure shall be NEMA 4X with drip shield, 14 gauge stainless steel (minimum), welded construction. The enclosure shall have an outer weather door, a hinged inner "operator's door" and mounting hardware.
 - b. All equipment, controls, etc., shall be located inside the enclosure. Selector switches, pilot lights, etc., shall be located on a deadfront swingout panel (operator's door) located behind an outside weather door. All other equipment, exposed wiring, etc., shall be located behind the swingout panel.
3. Controller Features
- a. Operating Sequence:
 - 1. When a pump is called for by the water level in the wet well, the control unit shall send a start signal to the appropriate pump and verify operation with the starter auxiliary contact. Appropriate verification time delays shall be included.
 - 2. When the wet well level continues to rise the second pump shall start.
 - 3. When the wet well level reaches low level, the pump(s) shall stop and pump alternation shall occur.
 - 4. When the pump run verification signal is not received with the appropriate time period, the alternator shall deselect the failed pump, select the next pump, remove the failed pump from the sequence, illuminate a pump fail light. The failed pump shall remain out of service and the pump fail light shall remain illuminated until manually reset.
 - b. Terminal blocks for incoming power, pump power conductors, level sensors, leak detectors, motor thermal sensors, and control wiring.
 - c. Circuit breakers with over-current protection for each of two pumps and the convenience power transformer. Circuit breakers shall be magnetic-

hydraulic or thermal magnetic, ambient temperature compensated type, calibrated and factory sealed with the proper trip setting. The devices shall have a minimum interrupting rating of 10,000 RMS symmetrical.

- d. Magnetic full voltage starters for each of two pumps. The starter overload relays (one per phase) shall be ambient compensated, quick-trip type. Overload elements shall be matched to the pump motor characteristics.
- e. Convenience and control power transformer with 460 volt primary and 120/240 volt secondary rated at 2KW (where required due to three phase service).
- f. Convenience power distribution panel (30A, 120/240V, 1PH-3W) with main breaker and 20A, 1P branches. Circuit breaker operators shall be accessible without opening the deadfront "Operator's door". Branch breakers shall be supplied as follows: One for control, one for GFI receptacle, and one for condensate heater.
- g. GFI type duplex convenience receptacle (120V, 20A) mounted on the dead front operators door.
- h. A low volt power supply and interface system suitable for operation of the float switches in an intrinsically (explosion proof) safe mode.
- i. An adjustable thermostatically controlled heater to provide condensate protection inside the enclosure.
- j. Two pump automatic electronic alternator which will alternate the pumps with each pump down cycle.
- k. The pump controller shall provide relay outputs to interface with the motor control devices as required.
- l. Running time meters for each pump. The meter shall indicate the number of hours of pump operation. The meter shall be enclosed in a dust and moistureproof molded plastic case. The flush mounted dial shall register in hours and tenths of hours up to 999.9 hours before repeating.
- m. The control panel shall provide the following status/alarm indications for each pump:
 - 1. Pump running light (green)
 - 2. Pump failed light (red)
 - 3. Seal failure
 - 4. High wet well level

In addition, the panel shall have a Hand-Off-Auto selector switch for each pump to control mode of pump operation and timing modules as required for the pump failed feature.

- n. The local alarm system shall consist of an alarm light and shall signal any of the above alarm conditions.
- o. The alarm light shall be a weatherproof high intensity strobe fixture with a red lexan globe and a metal globe guard mounted on top of the enclosure.

D. Level Sensors

- 1. The level sensors shall consist of weighted floats with mercury contacts rated for low volt operation at milliwatt levels. Each level sensor shall be furnished complete with sufficient cable length to run to the terminal box below the pump station controller and leave slack for future level adjustment.
- 2. Floats shall meet the requirements for Class 1, Division 1, Group C & D and be intrinsically safe for installation in an explosion hazard environment.
- 3. Floats shall operate at a maximum of 24 volts.
- 4. Furnish a stainless steel bracket mounted in the hatch opening for hanging the sensor cables.

2.03 LIFT STATION PIPING:

- A. Interior lift station and valve pit piping shall be flanged ductile iron, centrifugally cast conforming to the latest revisions of ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.51. The interior surface of the pipe shall be cement lined and seal coated in accordance with ANSI/AWWA C104/A21.4. Pipe shall be Pressure Class 250 minimum.
- B. Flanges shall be of 250 psi working pressured, drilled to ASA 125 pounds standards and meeting the requirements of ANSI/AWWA C111/21.10.

2.04 VALVES:

- A. General:
 - 1. All valves shall be furnished with an exterior finish coating the same as the adjacent piping system to which they are connected or as approved by the Engineer.

2. All valves of the same type shall be by the same manufacturer.
3. Where required for satisfactory operation of valves, provide extension stems, stem guides, cast iron valve and curb boxes, floor boxes and other valve appurtenances. Extension stems shall be complete with guide bearings, wrench nut, and tee handle wrench. All valve stems and machinery stuffing boxes shall be packed with material as selected for the intended service. All valves shall be designed for repacking.
4. Tee wrench operators shall be provided as required for proper operation.

B. Plug Valves:

1. Plug valves shall be of the non-lubricated, resilient seated, eccentric type.
2. All plug valves shall be of the size indicated on the Drawings. All plug valves shall be of the drip-tight-closing, resilient-faced plug type, and shall be of the eccentric seating construction such that the opening movement of the closing member (plug) results in the closing member rising off the body seat contact. Port areas shall be equal to at least 80 percent of the nominal size pipe area.
3. Valve bodies, bonnets and plugs shall be constructed of cast iron meeting the requirements of ASTM A126 Class B.
4. Valves shall be rated for 175 psi up to 12" and 150 psi for valves 14" and larger. An adjustable close position stop shall be provided for field adjustment. The seat end and standard flow direction shall be cast on the valve body.
5. All shaft seals shall be replaceable without disassembling the valve and while the valve is under system operating pressure.
6. The plug shall be of a one piece design with a precision molded resilient facing. The resilient seating surface shall not be in the flow way pattern when the valve is in the open position. The body seating surface shall be welded nickel overlay containing a minimum of 90% nickel.
7. Radial journal bearings shall be stainless steel, of the permanently lubricated type. Two thrust bearings shall be provided in the upper journal area, one of stainless steel and one of teflon. The lower journal shall have one stainless steel thrust bearing of the non-adjustable type. Grit seals shall be furnished in the upper and lower journals to prevent abrasive media from entering the bearing and seal areas.
8. Unless otherwise noted or shown, all valve and connections shall be ANSI Class 125 flanges.

9. Valve shall be series 5000 as manufactured by Val-Matic Valve & Mfg. Corp., Series 100 as manufactured by Dezurik, or equal.
- C. Rubber Flapper Swing Check Valves:
1. Swing check valves shall have a cast iron body and cover meeting the requirements of ASTM A126, Class B. The valve body shall have full flow equal to the nominal pipe diameter at any point through the valve. Valve shall be designed for a 175 psi minimum working pressure.
 2. The valve seating surface shall be on a 45 degree angle to minimize disc travel. The disc shall be of one piece construction, precision molded with an integral O-ring type sealing surface. The disc shall be made of Buna-N and have a non-slam closing characteristic by means of a 35 degree disc stroke and disc return action.
 3. The top access port shall be full size, allowing removal of the disc without removing the valve from the pipeline.
 4. The check valve shall have backflow capabilities by means of a screw type backflow actuator.
 5. The interior of the valve shall be coated with an epoxy suitable for potable water.
 6. Unless otherwise shown or noted, the check valves end sections shall be ANSI Class 125 flanges.
 7. Rubber flapper swing check valves shall be as manufactured by Val-Matic Valve and Manufacturing Corp. or equal.
- D. Mud Valves: Valves shall be of spigot end, non-rising stem design having a cast iron body. The stem, stem nut, seat ring and disc ring shall be made of bronze. All bolts and nuts shall be of corrosion resistant steel. Valves shall be furnished complete with extension stem having a 2" square not as required for the application. Each valve to be furnished with a tee handle wrench of length as required by the drawings. Mud valves shall be Model F-3080 as manufactured by Clow, or equal.

ARTICLE III - WATER DISTRIBUTION SYSTEMS

SECTION A - DOMESTIC WATER SYSTEMS

PART 1 - GENERAL

- 1.01 DESCRIPTION: This section describes the installation and testing requirements for domestic water systems including water mains, hydrants, service meters and connections and other appurtenances associated with the distribution of potable water.
- 1.02 QUALITY ASSURANCE:
- A. All similar components shall be manufactured and supplied by one manufacturer unless specifically approved otherwise by the City.
 - B. All material shall be new and unused of the minimum standards specified herein.
- 1.03 CODES AND STANDARDS: The following codes and standards are referenced in this section.
- A. American Waterworks Association (AWWA)
 - B. American National Standards Institute (ANSI)
 - C. American Society of Testing and Materials (ASTM)
 - D. National Sanitation Foundation (NSF)

PART 2 - PRODUCTS

- 2.01 WATER MAIN PIPING:
- A. PolyVinyl Chloride (PVC) Pipe
 - 1. All PVC water main piping shall conform to the requirements of AWWA C900, DR14 (Class 200) or ASTM D2241, SDR-21 (200 psi). PVC pipe shall have a cell classification of 12454B or 12454C.
 - 2. All pipe shall be marked as to indicate appropriate ASTM or AWWA designation and pressure class.
 - 3. Pipe Joints - All PVC pipe joints shall be bell and spigot type with elastomeric gaskets conforming to the requirements of ASTM D3139.

B. Ductile Iron Pipe:

1. All ductile iron pipe shall be manufactured in accordance with ANSI/AWWA C151/A21.51 for pipe barrel construction; ANSI/AWWA C151/A21.51 for determining pipe wall thickness; ANSI/AWWA C151/A21.51 for installing cement mortar lining; and ANSI/AWWA C151/A21.51 for construction of pipe fittings.
2. All ductile iron pipe and pipe fittings shall be mortar lined with bituminous seal coat in accordance with ANSI 21.4.
3. Unless otherwise shown on the Drawings, the thickness class for ductile iron pipe shall be Pressure Class 350 for pipes 12 inches or smaller and Pressure Class 250 for pipes 14 inches or larger.
4. Pipe Joints - Ductile iron pipe joints shall conform to the following requirements:
 - a. Push-on and Mechanical - Push-on and mechanical joints including accessories shall conform to ANSI/AWWA C151/A21.51. Bolts shall be high strength cast iron with tee head with hex nuts.
 - b. Flanged - Flanged joints shall not be used for underground installations except within structures. Flanged joints shall meet the requirements of ANSI/AWWA C151/A21.51 or ANSI B.16. All flanged joints shall be rated for 250 psi pressure and have ASA 125 lb. bolt patterns. All flanged joints shall be furnished with 1/8 inch thick full face red rubber gaskets.
 - c. Bell and Spigot - Bell and spigot joints shall conform to ANSI/AWWA C151/A21.51.
5. Polyethylene Encasement - Ductile iron mains shall be encased with polyethylene film conforming to ANSI/AWWA C151/A21.51.

2.02 FITTINGS: Fittings for all types of pipe shall be ductile iron mechanical joint type manufactured in accordance with ANSI/AWWA C110/A21.10 and having a minimum pressure rating of 250 psi.

2.03 GATE VALVES: Gate valves shall be cast iron body, double disc, non-rising stem type manufactured in accordance with ANSI/AWWA C500. Valves shall have bronze seat and disc rings, o-ring seals and be rated for a maximum working pressure of 200 psi. for valves 12 inches and smaller and 150 psi for valves 14 inches and larger. Valves shall be as manufactured by Mueller Company, Kennedy Valve Company, or equal.

- 2.04 INSERTING VALVES: Where inserting valves are required on existing water mains, they shall be ductile iron double disc as specified above. Inserting valves shall be Mueller Type H-800 or equal.
- 2.05 TAPPING VALVES AND SLEEVES:
- A. Tapping sleeves shall be iron body with mechanical joint ends and flanged valve end. Sleeves shall be rated for a working pressure of 200 psi thru 12" sizes and 150 psi when 14" and larger. Sleeves shall be suitable for the existing water main material. Tapping sleeves shall be Mueller Type H-615 or H-616, or equal.
 - B. Tapping valves shall be iron body, double disc, non-rising, stem gate valves as specified above. Tapping valves shall have mechanical joint by flanged ends as required to connect with the tapping sleeve. Tapping valves shall be Mueller Type 667 or equal.
- 2.06 VALVE BOXES:
- A. Valve boxes for buried valves shall be cast iron, either two piece or three piece type. Boxes shall be extension type with slide or screw type adjustment. Each base and bottom section shall be sized for the valve served. Valve box covers shall be stamped "Water" for identification.
 - B. Valve boxes for curb stops shall be cast iron, extension type with foot piece, curb box and lid.
- 2.07 FIRE HYDRANTS:
- A. Fire hydrants shall be of the post dry type barrel design conforming to ANSI/AWWA C502. Hydrants shall be rated for a 200 psi working pressure.
 - B. The main valve closure shall be of the compression type, opening against system pressure and closing with the pressure.
 - C. The main valve opening shall be 5¼" and shall be designed so as to allow removal of the seat and drain valve mechanism without disturbing the ground line. The hydrant shall have two hose nozzles and one pumper nozzle.
 - D. Hydrants shall be of the dry type design with o-ring sealed reservoir.
 - E. Fire hydrants shall be Mueller Super Centurion 200 or equal.

2.08 SERVICE METERS:

- A. Water service meters shall be magnetic drive, positive displacement, nutating disc type meeting the requirements of AWWA C700.
- B. Meters 5/8" through 1" shall have a cast bronze body and two-piece chamber enclosing a molded plastic disc which nutates on a wear resistant thrust roller.
- C. Meters 1½" through 2" shall have a cast bronze body with bolted top and flat disc piston of molded plastic.
- D. Meters shall include a plastic internal strainer and plastic lid and bonnet.
- E. Meters shall be rated for a maximum working pressure of 150 psi and register in U.S. gallons. The register shall be permanently sealed.
- F. Service meters shall be 400 Series or 500 Series as manufactured by Hersey Products, Rockwell type SR, or equal.

2.09 METER SETTERS:

- A. Meter setters shall be prefabricated copper yoke type sized as required for the service meter.
- B. Units shall include a lockwing type ball meter valve on the inlet and dual check valve on the outlet.
- C. The fittings and arrangement shall be as required for the application.
- D. Meter setters shall be as manufactured by Mueller, Ford Meter Box, or equal.

2.10 METER BOXES:

- A. Meter boxes shall be made of rigid PVC having a metallic bottom and sized as required for the application.
- B. Meter boxes shall be preassembled, ready for meter installation and shall include meter setters as specified in paragraph 2.10 above.
- C. Boxes shall be installed complete with foam insulating pad for protection against freezing.
- D. Meter boxes shall be EZ-Setter as manufactured by Mueller Co. or equal.

2.11 METER BOX COVERS:

- A. Meter box covers shall be cast iron of standard weight construction. Covers shall be sized as required to fit the applicable meter box provided the minimum diameter is 15".
- B. Covers shall be of the flat lid, no lock type having an integral reader lid. Covers shall be stamped with the words "water meter".
- C. Where required for concrete or asphalt installation, the meter box covers shall include a 4" cast iron frame.
- D. Meter box covers shall be as manufactured by Mueller, Ford Meter Box, or equal.

2.12 TAPPING SADDLES: Where plastic mains are tapped, furnish and install service clamp or saddle with threaded tap for 3/4" or 1" service as manufactured by Mueller, Ford Meter Box, or equal.

2.13 CURB STOP:

- A. For 1-1/2" services, provide a Ford or Mueller curb stop at the main. Stops to be bronze and ball with Buna-N rubber "O" rings. Connections to be for pack joints.
- B. Furnish cast iron curb stop box and one curb stop wrench.

2.14 SERVICE TUBING:

- A. Customer service tubing from the main to the meter installation shall be polybutylene plastic tubing in accordance with AWWA Specification C-902. Tubing shall be for working pressure up to 250 psi and shall have an SDR of 9.
- B. Tubing for 5/8" x 3/4" meters shall be 3/4" size, unless noted otherwise on the plans.
- C. Tubing for 1" meters shall be 1" size unless noted otherwise.
- D. 1-1/2" service shall be Class 250 PVC water main.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Pipe Depth - Water mains shall be installed to the depths shown on the Plans, except that no line shall be installed with less than 42" of cover.

B. Relation to Sanitary Sewers:

1. Unless specifically allowed otherwise by the City, water mains shall be installed a minimum of ten (10) feet horizontally from any existing or proposed sanitary sewer. Where such a requirement is not possible, the sanitary sewer material shall meet the material requirements for water mains as specified herein for the entire length where the minimum separation cannot be met.
2. Where water mains cross sanitary sewer lines, a minimum vertical clearance of 18" shall be provided, whether the main is above or below the sewer. Conformance with this requirement shall not waive the minimum cover requirements.

C. Plastic Pipe Locating Tape:

1. Locating tape shall be installed over all PVC water lines. This tape shall be of a type which can be used with electronic pipe locating devices.
2. Locating tape shall be continuous and in a 3" width. Tape shall be a sandwich type of a metallic strip between polyethylene film. Tape shall be printed "Caution, Water Line Buried Below".
3. Tape shall be spliced together for continuity.
4. Tape shall be laid in the trench along the pipe centerline 2' below finish grade.

D. Valves:

1. Butterfly and gate valves shall be set vertically and bedded solidly on trench bottom. Flanged valves shall be securely bolted utilizing red rubber or asbestos gaskets and high strength cast iron bolts and nuts.
2. Valve boxes shall be set squarely over tee wrench nut and vertical. Leave valve box flush with finish grade and readjust as necessary to reconfirm with surface until final settlement or paving is complete.
3. All valves shall be buried and have road boxes unless otherwise specified.

E. Fire Hydrants:

1. Fire hydrants shall be rigidly blocked and braced against thrust. Contractor shall back up hydrant base with concrete and support base all as detailed on the plans.

2. An envelope of washed, coarse gravel shall be provided around the drain ports of the hydrants to assure barrel drainage of the hydrants. Gravel shall be a minimum 2 feet diameter and to 6 inches above ports.
 3. Ground line marks on hydrants shall be set 2 inches above finish grade. All hydrants shall have one prime coat and two field coats of a suitable exterior machinery enamel or color used in this system. Prime coat shall be touched-up prior to application of finish coat.
- F. Tapping Valves: Tapping valves shall be installed and the tap made in accordance with the manufacturer's recommended procedures and good practice. Valves shall be securely supported in vertical position during tapping operations. Tamp fill thoroughly around and under valve after installation. Installation shall be checked for leaks before backfilling.
- G. Service Connections: At locations shown on the plans or where designated by the City, the Contractor shall furnish all materials and labor to connect water services to mains. Any piping or fittings required to make the connection and provide service shall be furnished by the Contractor. Meter pits and settings shall be installed plumb and true according to good construction practices.

3.02 HYDROSTATIC TESTING:

- A. The Contractor shall perform a combination pressure and leakage test on the new mains after they have been filled with water as previously specified. This work shall be done after all of the main is backfilled.
- B. The test procedure shall be as herein specified and in accordance with applicable provisions of AWWA Standard C-600.
- C. The mains shall be subjected to a minimum test pressure of 150% of the maximum system operating pressure of the main being tested provided that the maximum pressure does not exceed the ratings of the valves, restraints and other materials. The duration of each test shall be at least two hours. Each valved section of pipe shall be so tested.
- D. The test pressure shall be accomplished by means of a pump connected to the pipe. Such pump, including all meters, connections, fittings, gauges, etc. shall be supplied by the Contractor.
- E. Leakage shall be defined as the quantity of water required to refill the main in order to maintain pressure within 5 psi of the specified test pressure after the pipe has been filled with water and expelled of air. Leakage shall not be measured by a drop in pressure over a period of time.

- F. No pipe installation shall be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{SD(P)^{\frac{1}{2}}}{133,200}$$

where: L = allowable leakage, in gallons per hour
S = length of pipe tested, in feet
D = nominal pipe diameter, in inches
P = average test pressure, in pounds per square inch (gauge)

3.03 DISINFECTION OF MAINS

- A. General: The Contractor shall be required to disinfect all new water mains, services, leads and appurtenances in accordance with AWWA C-651 "Standards for Disinfecting Water Mains". The work shall consist of filling the mains, disinfection, testing, and flashing as specified herein.
- B. Filling the Mains:
1. The new piping system shall be slowly filled with water from the utility distribution system. Where pressure is insufficient to raise water into mains at higher elevations, Contractor shall furnish booster pumping equipment to complete the filling and flushing.
 2. All air shall be expelled from the mains as they are filled. Air valves and hydrants at high points in the main shall be utilized for this purpose. Where permanent vents are not provided, Contractor shall install corporation cocks at high points to assure removal of air. Such cocks shall be left in place and location noted by dimension ties on the field record set of drawings.
- C. Disinfection:
1. Before being placed in service, all new mains and repaired portions of, or extensions to, existing mains shall be chlorinated with a chlorine solution so that a chlorine residual of not less than 25 PPM remains in the water after 24 hours standing in the pipe.
 2. A chlorine gas-water or hypochlorite mixture shall be applied by means of a solution-feed chlorinating device. Chlorinating devices for feeding solutions of chlorine gas must provide means for preventing the backflow of water into the chlorine cylinder.
 3. The preferred point of application of chlorinating agent is ahead of the beginning of the pipeline extension or any valve section of it and through a

corporation stop inserted by the Contractor, in the top of the pipe. The water injector for delivering the chlorine-bearing water into the pipe should be supplied from a tap on the pressure side of the gate valve controlling the flow into the pipeline extension.

4. Water from the existing distribution system or other source of supply shall be controlled so as to flow slowly into the newly laid pipeline during the application of chlorine. The rate of chlorine mixture flow shall be in such proportion to the rate of water entering the pipe that the chlorine dose applied to the water entering the newly laid pipe shall produce at least a 25 PPM residual after 24 hours.
5. If the circumstances are such that a shorter retention period must be used, the chlorine concentration shall be increased accordingly.
6. In the process of chlorinating newly laid pipe, all valves or other appurtenances shall be operated while the pipeline is filled with the chlorinating agent.

D. Testing and Flushing:

1. Following chlorination, all treated water shall be thoroughly flushed from the newly laid pipeline at its extremities until the replacement water throughout its length shall, upon testing, be proven comparable in quality to the water served the public from the existing water supply system and approved by the Indiana State Board of Health. This satisfactory quality of water delivered by the new main should continue for a period of at least two full days as demonstrated by laboratory examination of samples taken from a tap located and installed in such a way as to prevent outside contamination.
2. Before the system is placed into use, the Contractor shall obtain from the new mains two successive water samples 48 hours apart, and have them tested for bacteria content by the State Board of Health. Samples shall be drawn in accordance with the Board's procedure.
3. If samples do not prove satisfactory, the system shall be rechlorinated and resampled until safe water is approved.

ARTICLE IV - STORM SEWER SYSTEMS

SECTION A - STORM SEWERS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section describes the materials and installation required for storm sewer piping systems.
- B. This section is to be used only when non-watertight joints will be allowed. Hydrostatic or air testing will not be required for storm sewers unless excessive leakage is suspected.
- C. This specification covers the following types of materials for storm sewers:
 - 1. Reinforced Concrete Pipe and Fittings
 - 2. Polyvinyl Chloride Pipe (PVC)
 - 3. Corrugated Metal Pipe
 - 4. Perforated Underdrain Pipe

1.02 PIPE IDENTIFICATION

- A. Each length of pipe shall bear the name of the manufacturer, location of the plant, and the date of manufacture. Each length shall likewise be marked to designate the class or strength of the pipe. The marking shall be made on the exterior or interior of the pipe barrel near the end and shall be plainly visible.

PART 2 - PRODUCTS

2.01 REINFORCED CONCRETE PIPE AND FITTINGS

- A. All concrete pipe shall conform to ASTM C76, "Reinforced Concrete Culvert Storm Drain and Sewer Pipe".
- B. All concrete pipe shall be Class III, wall B unless otherwise approved by the City.
- C. All reinforced concrete pipe joints shall be spigot groove type joint with O-ring gasket conforming the ASTM C443 "Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets".

- D. Precast reinforced concrete end sections shall be in accordance with the cited specifications to the extent which they comply. End sections shall be sized to match the pipe.

2.02 POLYVINYL CHLORIDE PIPE (PVC)

A. PVC Pipe 4" through 15" in diameter.

- 1. All PVC Pipe 4" through 15" in diameter shall conform to ASTM D1784, "Rigid Poly (Vinyl Chloride) and Chlorinated Poly (Vinyl Chloride) Compounds" and either:
 - a. ASTM F794, "Poly (Vinyl Chloride) (PVC) Ribbed Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter",
 - b. ASTM F949, "Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings", or
 - c. ASTM D3034, "Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings".
- 2. PVC sewer pipe shall be SDR 35 with cell classification of 12454-B or 12354-C.
- 3. Pipe joints shall be push-on type conforming with ASTM D3212 "Joints for Drain and Sewer Plastic Pipes using Flexible Elastomeric Seals".

B. PVC pipe 18" through 48" in diameter.

- 1. All PVC pipe 18" through 48" in diameter shall conform to ASTM D1784, "Rigid Poly (Vinyl Chloride) and Chlorinated Poly (Vinyl Chloride) Compounds and either:
 - a. ASTM F794, "Poly (Vinyl Chloride) (PVC) Ribbed Gravity Sewer Pipe and Fittings based on Controlled inside Diameter",
 - b. ASTM F949, "Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings", or
 - c. ASTM F679, "Poly Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings", for sizes 18" to 27" only.
- 2. Pipe shall be made from PVC compounds with a minimum cell classification of 12364A.

3. Pipe joints shall be push-on type conforming with ASTM D-3212.

C. Gaskets shall be factory installed and chemically bonded to the bell end of the pipe.

2.03 CORRUGATED METAL PIPE (CMP)

A. Corrugated Metal Pipe shall be aluminum-zinc-coated steel manufactured in accordance with ASTM A806 "Aluminum-Zinc-Coated Steel Sheet (by Hot-Dip Process) for Storm Sewer/Drainage Pipe".

B. When required by the Drawings, bituminous coating for corrugated steel pipe shall meet the requirements of ASTM A849 "Post-Coated (Bituminous) Corrugated Steel Sewer and Drainage Pipe".

C. End sections for CMP sewers or culverts shall be of the same material as the pipe. End sections and coupling bands shall be suitable for the pipe size specified. Band couplers shall have corrugations that mesh with the corrugations of the pipe.

D. Fittings such as stub-tee connections or saddles shall be shop fabricated.

2.04 PERFORATED UNDERDRAIN PIPE:

A. Perforated underdrain pipe shall be corrugated polyethylene tubing manufactured in accordance with ASTM F405 or ASTM F667 (10" to 15" only).

B. Underdrain piping shall be bedded with gravel or selected bedding material as shown and required by the details included herein.

PART 3 - EXECUTION

3.01 GENERAL CONSTRUCTION REQUIREMENTS:

A. Before installing piping, the Contractor shall carefully verify location depth type of joint needed and size of pipe to which connection is proposed. Contractor shall assure that the lines can be run as contemplated without interfering with footings, walls, other piping, fixtures, etc.

B. All lengths of pipe shall be dimensioned accurately to measurements established at the site and shall be worked into place without springing or forcing. Cut sections of pipe shall be reamed to remove all burrs.

- C. Utmost care shall be exercised in transporting and handling all pipe, fittings, valves, etc., in order to avoid shock and damage to pipe and coatings. Lifting shall be by joist or skids when hand lifting is not feasible. Dropping of the pipe will not be permitted. Pipe handled on skidways must not be skidded or rolled against pipe already on the ground. Damaged or defective pipe and appurtenances shall be replaced.
- D. The pipe shall be thoroughly cleaned before being laid and kept clean during construction.
- E. The Contractor shall cut all pipe and drill all holes that may be necessary.
- F. Pipe trenching and backfill shall be performed in accordance with Article I - Section C.

SECTION B - INLETS AND CATCH BASINS

PART 1 - GENERAL

- 1.01 **DESCRIPTION:** The work of this section shall include the manufacturing and installation of precast concrete storm sewer inlets and catch basins as detailed and specified herein.
- 1.02 **DELIVERY, STORAGE AND HANDLING:** Precast concrete structures shall be delivered to the site complete and in structurally sound condition. The Contractor shall take proper care in moving the structures to prevent cracking, breaking or otherwise damaging the structure.

PART 2 - PRODUCTS

- 2.01 **GENERAL:** All precast concrete structures to be used on the project shall be structurally sound and free of defects. Any spalled concrete or voids shall be properly repaired using equivalent strength grout and properly cured before placement. Structures showing excessive cracking or damage should be rejected and shall be replaced at the discretion of the City.
- 2.02 **CONCRETE STRENGTH:** All concrete used in the production of precast inlets and catch basins shall have a minimum compressive strength of 4,000 psi at 28 days.
- 2.03 **INLETS AND CATCH BASINS:**
 - A. All precast inlets and catch basins shall be manufactured in accordance with ASTM C478 and the Indiana Department of Transportation (IDOT) "Standard Specifications".
 - B. Reinforced concrete pipe used as inlets or catch basins shall meet the requirements for concrete storm sewer pipe specified in Section A, paragraph 2.01 above.

- C. Where practical, inlets and catch basins shall be of standard size and dimensions as identified by the IDOT standards.

2.04 CASTINGS:

- A. Castings for inlets and catch basin shall be made of either gray or ductile iron. Metal used in the manufacture of castings shall conform to ASTM A48 Class 35B for gray iron or ASTM A536 Grade 65-45-12 for ductile iron.
- B. Castings shall be of uniform quality, free from blowholes, shrinkage, distortion or other defects.
- C. Castings placed in roadways, drives, or other locations subject to vehicular traffic shall be heavy duty type, suitable for the applicable loadings.
- D. Castings shall be as manufactured by Neenah Foundry Company, East Jordan Iron Works or equal.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Storm sewer inlets and catch basins shall be of the size and type shown on the plans and as detailed herein. Structures shall be installed level and true to grade.
- B. Excavation and backfill for inlets and catch basins shall be in accordance with Article I, Section B. All structures shall be placed on a leveling surface consisting of a minimum of 4" of stone or "B" borrow.
- C. Where structures are placed in pavement areas or areas which may be paved in the future, the height of the casting shall be determined by the depth of pavement.
- D. Inlet and outlet pipes shall extend through the structure walls a sufficient distance to allow for connections to the storm sewer system. Pipes shall be flush with the interior wall face and mortared into place so as to prevent leakage around their outlet surfaces.

ARTICLE V - CONSTRUCTION STANDARDS FOR STREETS

SECTION A - STREETS AND ROADS

PART 1 - GENERAL

- 1.01 DESCRIPTION: The work of this section includes the supply of all materials, labor, and equipment required to construct all streets and roads.
- 1.02 QUALITY ASSURANCE: All materials used shall be new, of minimum quality as specified herein. Material testing and certification documents shall be made available to the City or its agents upon request. This information shall include, but not be limited to, materials testing reports, gradation analysis, and manufacturers certifications.

PART 2 - PRODUCTS

- 2.01 GENERAL: All materials used in construction of streets and roads shall meet the requirements of the latest revision of the Indiana Department of Transportation (INDOT) Standard Specifications.

PART 3 - EXECUTION

- 3.01 GENERAL:
 - A. Streets and roads shall be installed in accordance with all applicable construction standards and practices of the INDOT Standard Specifications, and as detailed herein.
 - B. In addition to these standards, construction shall be performed as outlined in Chapter V "Local Roads and Streets" of the Association of State Highway and Transportation Officials (AASHTO) geometric design policies. Where conflict exists between these standards and AASHTO design policies, these standards shall take precedence.